

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

REVIEW:

Branch
office
routers
that can
tame remote
links.

Page 53.



SPECIAL REPORT

Rats!

ISPs and customers forced to reexamine 'Net disaster recovery plans in light of rascally rodent incident at BBN POP.

By Charles Bruno
and Joanie Wexler
Palo Alto, Calif.

What's it take to knock out a major Internet service provider and cut off service to hundreds of big corporate customers? An earthquake? A fire? A flood?

Would you believe a wayward rat? That was the culprit behind the recent power outage at BBN

Planet's Internet site here, which brought the location down for nearly a day. The incident raised the now-familiar spectre of an Internet meltdown and left many asking some very basic questions about the 'Net.

Are ISPs adequately addressing disaster recovery? How can an outage at a single site cripple so many companies? What can I do to protect myself?

Experts say the event demonstrates some ISPs are not addressing disaster-recovery plans adequately, although the largest ones are on the right track. At the very least, the epi-

See Rats, page 68

THE BUZZ ON BBN OUTAGE

"It was what I call a megalapse."

Robert Metcalfe, vice president of technology at International Data Group

"In the case of an ISP like BBN, defense against long outages almost certainly requires motor generators."

Vinton Cerf, senior vice president at MCI

MCI kicks LAN access service into high gear

By Joanie Wexler
San Jose, Calif.

MCI Communications Corp. is upgrading its network to offer new remote access options and make it more appealing for customers to outsource their remote access headaches.

The upgrade is aimed at boosting MCI's year-old Remote LAN Dial service, which allows customers to hand over their modem pools, remote access servers, authentication servers and other functions to the carrier. In an interview last week, MCI officials outlined their plans for the service, which in-

See MCI, page 14

Get more info online:

- IDC paper on the evolution of remote LAN access
- White papers on outsourcing IT resources



Enter the number to the left in the Doc-Finder box on the home page.

http://www.nwfusion.com

Frame relay to get 28-fold boost

By Tim Greene

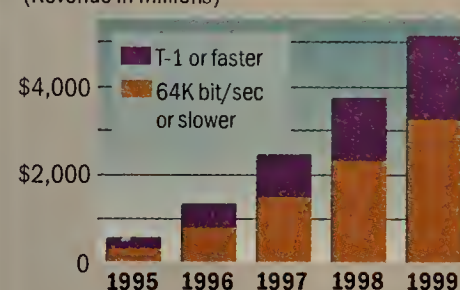
When users need a fat pipe for wide-area networking, ATM usually comes to mind. But now frame relay is making a play for that broadband market.

Spurred by T-1 frame relay users that need more bandwidth, the regional Bell operating companies and other carriers are rolling out frame relay at 45M bit/sec speeds.

By year-end, Ameritech Corp., Bell Atlantic Corp. and BellSouth Corp. will start deploying this T-3 frame service. Pacific Bell and SBC Communications, Inc. plan to have it next spring. GTE Corp., NYNEX Corp. and US WEST, Inc. are working on tariffs and hope to get regulatory approvals in

U.S. FRAME RELAY SERVICE MARKET

(Revenue in millions)



T-3 and fractional T-3 services, which are just emerging, are expected to contribute 7% of high-speed (T-1 or faster) frame relay revenue in 1999.

SOURCE: VERTICAL SYSTEMS GROUP, DEDHAM, MASS.

early 1997.

The local exchange T-3 push will complement similar efforts launched by interexchange car-

See T-3, page 69

Sync Research tools to ease frame relay net management. Page 8.

In this issue:

- Secure? Better think twice
- Doing the legacy tango
- Review: WebSite Professional
- Spiders weave it together
- Primer: LDAP

Starts after Page 36.

MainCon tools track PCs from cradle to grave

By Michael Cooney
Vienna, Va.

Tracing the lineage of thousands of PCs is like hunting down long-lost relatives — you get lots of stories but few hard facts.

Ambitious start-up MainControl, Inc. aims to change that tedious task this week as it rolls out MC/EMpower, a family of software packages to help users track PCs from the day they are installed until they are removed from the network.

But that is not all. The company said the new packages also offer multivendor software dis-

See MainCon, page 14

The devil's in the details

Florida Power's ATM conversion moves along nicely, until switch tuning throws staff a wicked curve.

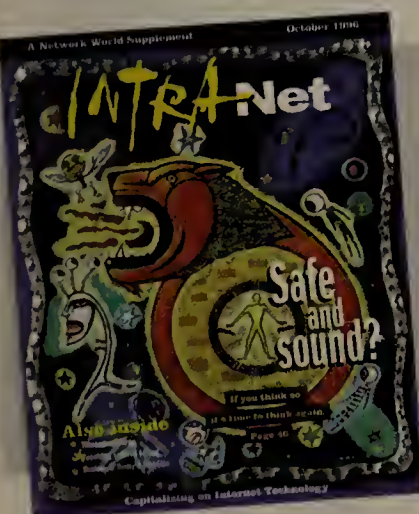
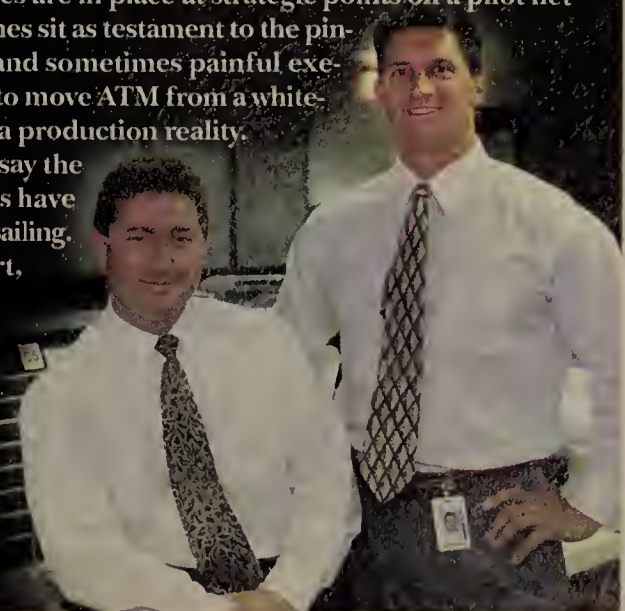
Second in an occasional series.

By Charlie Bruno

Four months after Florida Power & Light Co. executives authorized an ambitious plan to deploy ATM across a statewide SONET net, eight switches are in place at strategic points on a pilot network. The switches sit as testament to the pinpoint planning and sometimes painful execution required to move ATM from a whiteboard sketch to a production reality.

That's not to say the past four months have been all smooth sailing. For the most part, See FPL, page 56

Rick Carpani (left) and Dave Fernandez are spending countless hours configuring FPL's ATM switches.



HOW WILL THE LAUNCH OF MID-RANGE COMPUTING? LET'S JUST

The Compaq ProLiant 5000 has arrived. And it's going to change everything that lies in its path. Including how you think about mid-range computing.

The ProLiant 5000, with its Pentium® Pro processor, delivers unprecedented performance for mid-range solutions.

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more than power—you need control. So we've combined the Pentium Pro processor with a concept we're calling Integration Management. Giving you new tools to manage your system throughout its entire life cycle.

Improvements to SmartStart now let you set up an Integration Server, which basically serves as a holding tank for all your software. It also simplifies the setup and maintenance of your network. All you have to do is configure your Integration Server and then, using SmartStart, deploy it across your entire network. It not only ensures consistency across

all your network servers, it saves you a lot more than just shoe leather.

Maintaining your network is easier now, too. Thanks to some cool new features on Compaq Insight Manager, you can get updates and new software revisions via the Internet, your modem or CD. And then

transfer them to the Integration Server just one time. You can even maintain your network

when you're away from the office. All you need is your notebook and a phone line.

We've also partnered with the industry-leading companies of system management applications. So now you can view your entire network in one place. Together, these and other improvements have helped reshape the landscape of mid-range computing, by creating the most manageable server in the industry. To find out more about the ProLiant 5000, visit our Web site at www.compaq.com, or call us at 1-800-315-7772. It's not just a server. It's a force to be reckoned with.

System	tpmC	\$ per tpmC
ProLiant 5000 6/166 M2	5676.93	\$135
HP 9000 Server T500	5621.00	\$380 [†]
WorldMark 5100S	5607.00	\$394
SPARC center 2000E	5124.21	\$323
HP 9000 Model K420	4939.11	\$232
IBM RS/6000 J30	3631	\$289

*A lot of companies claim to offer the lowest cost of ownership. But we have the benchmarks to prove it.**



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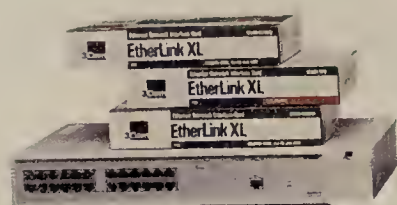
THE PROLIANT 5000 AFFECT
SAY ITS CODE NAME WAS "HURRICANE."



Introducing the ProLiant 5000.

COMPAQ

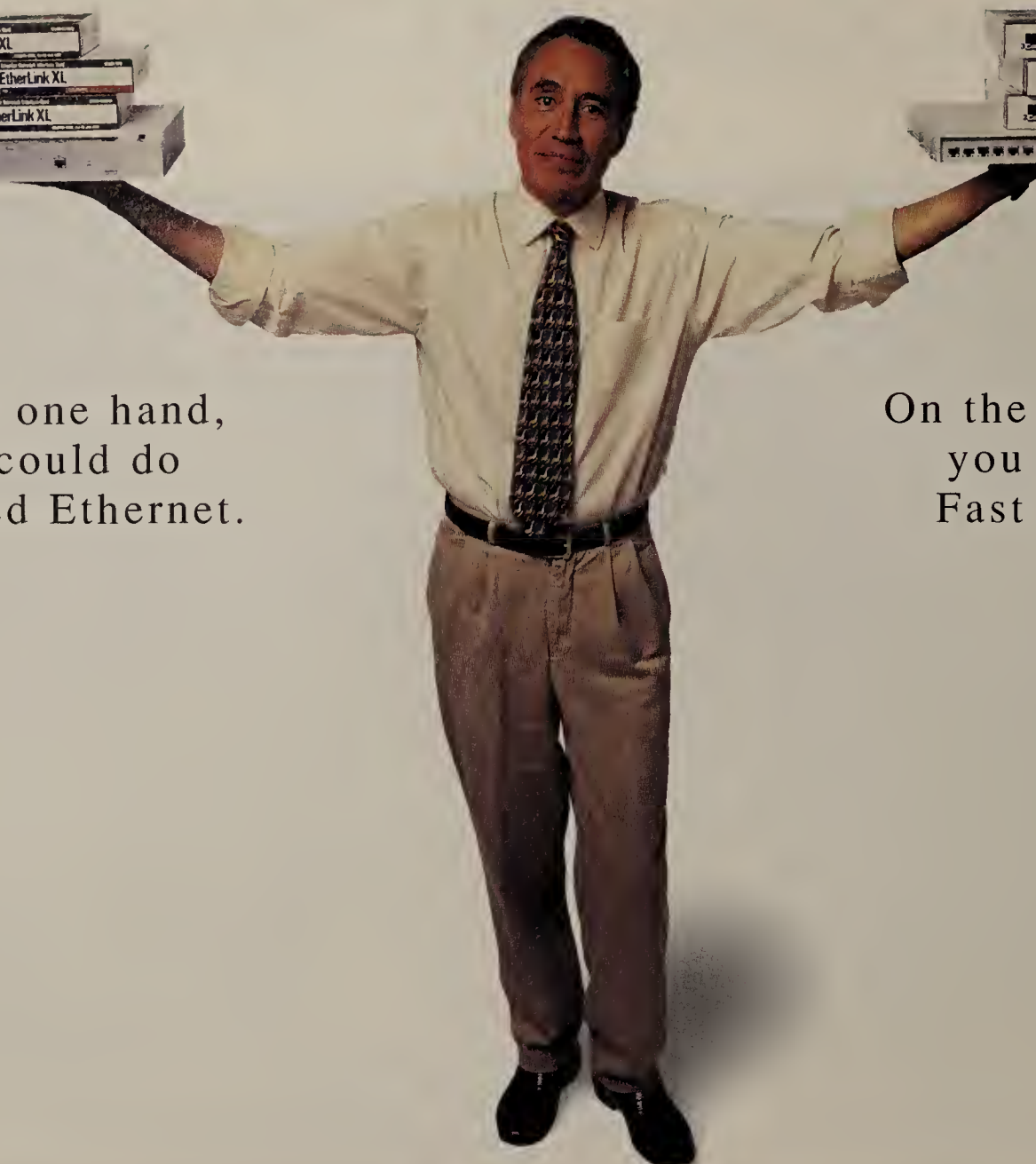
Has It Changed Your Life Yet?



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Switched Ethernet.



On the other hand,
you could do
Fast Ethernet.



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which lets you scale workgroup performance based on the needs of the people in that workgroup.

For more information on Switched Ethernet or Fast Ethernet solutions, or to try an XL PCI network interface card for as low as \$49,* give us a call at **1-800-NET-3Com**. Either way you go, choosing 3Com is the sure way to get ahead.





News+

- **Internet:** Does the recent BBN power outage mean Bob Metcalfe was right about the imminent death of the 'Net, after all? Read the complete text of his comments on the outage, plus those of Internet pioneer Vinton Cerf and take a look at the BBN trouble ticket for the incident. **DocFinder: 2109.**
- **Outsourcing:** MCI will soon announce a revamp of its remote access outsourcing service. Browse a collection of white papers and articles on outsourcing and read where IDC sees the remote access market heading. **DocFinder: 2111.**
- **ISDN:** AT&T is slashing the costs of its broadband ISDN service; read a FAQ and primer on the BONDING protocol that makes broadband ISDN service possible. **DocFinder: 2120.**
- **Asset management:** Check out vendor white papers on setting up enterprise asset management systems. **DocFinder: 2121.**
- **Messaging:** Download papers on managing enterprise E-mail backbones. **DocFinder: 2190.**
- **Gigabit Ethernet:** XLNT Designs is looking to migrate its users from FDDI to Gigabit Ethernet. We've got a primer and articles on Gigabit Ethernet for you to download. **DocFinder: 2191.**
- **ATM:** Follow the continuing exploits of Florida Power & Light as it moves to an ATM net (page 1); then come online to read Part One of our coverage of their conversion and grab details of the Nortel Magellan switch at the heart of the changeover. **DocFinder: 2104.**

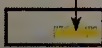


NetRef

- **Routers:** Read our review of five branch office routers this week (page 53), then download copies of our comprehensive guide to low-end routers and a review of high-end boxes. **DocFinder: 2108.**

HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on Registration and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Non-subscribers must fill out an online registration form.



Marc Myers thinks Oracle's Network Computing Architecture is pretty cool (page 40). What do you think? Select Forum, Columnists then Myers.

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Cabletron's Michael Skubisz says Cisco's recent move is locking IOS out of more than 60% of the switching market. Page 9.

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NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

News briefs, October 21, 1996

Ludwick leaving Bay

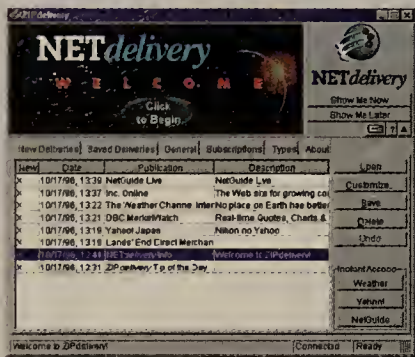
Andrew Ludwick resigned last week as president and chief executive officer of Bay Networks, Inc. after the company posted disappointing earnings for its 1997 fiscal year. Ludwick's resignation was expected, but he and Bay did not wait until a successor was found (NW, July 29, page I). Bay Chairman Paul Severino will serve as interim CEO until the company completes its search for a permanent replacement, which is now under way.



Bay's Ludwick

Special NETdelivery

NETdelivery Corp. of Fort Collins, Colo., is preparing to launch a personalized news and information service that delivers World-Wide Web content and publications to members' desktops. The system allows users to personalize a Web feed by geographic location or specified topics of interest. With free Provider software, companies such as clothing manufacturer Lands' End, Inc., which delivers content through the service, can design pages that include their logos and advertising. Member and Provider software can be downloaded for free from NETdelivery's Web site (www.netdelivery.com).



Putting competition on hold

A federal court in Missouri last week put a hold on Federal Communications Commission rules that spell out how monopoly local exchange carriers (LEC) must open up their networks to competing phone companies. While the monopoly LECs hailed the decision and hope for a permanent reversal, competing carriers said they would continue negotiating for network interconnections state by state. A final decision is expected by early next year.

Shockwave live

Macromedia, Inc., which makes the popular Shockwave program for delivering recorded video to World-Wide Web users, has partnered with Telos Systems to present users with live video within their browsers. Pricing and availability for the Telos Audio-active products that are needed to add multicasting capabilities to Shockwave will be available in early 1997.

ATM face-off

MCNC Network Systems Testing Center in Research Triangle Park, N.C., will hold an ATM Private Network-to-Network Interface showdown the week of Dec. 9. Vendors expected to participate include Bay Networks, Inc., Cisco Systems, Inc., IBM, 3Com Corp. and about 25 others. For more information, check out the organization's Web site (www.vitalnet.org/).

Viewstar gets gobbled up

Digital Systems International, Inc. last week said it will fork over about \$30 million worth of stock to acquire workflow pioneer Viewstar Corp. The combined companies will produce a Windows NT-based set of customer management applications.

Novell preps 'Net printing standard

Novell, Inc. this week is expected to line up industry support behind its proposed standard for conducting print jobs over the Internet. The company will announce the specifications for its Lightweight Document Print Application protocol at an Internet conference in San Diego in preparation for submitting a draft proposal to the Internet Engineering Task Force later this year.

Netscape eyes heavyweights with new client and server offerings

By Sari Kalin
New York

Netscape Communications Corp. officials here last week said they see Communicator — the company's new groupware/E-mail/browsing package — competing head-to-head with Lotus Development Corp.'s Notes and Microsoft Corp.'s BackOffice.

But as client/server messaging and groupware systems such as Notes open up to the World-Wide Web, analysts said, corporate users must decide whether Netscape can give them a good enough reason to switch to Communicator and its upgraded SuiteSpot server family, which was first reported in *Network World* last week.

"If everybody's settling on Internet standards, what's going to make me move off what I am on [now]?" asked Michael Gotta, senior research analyst for workgroup computing strategies at Stamford, Conn.-based META Group, Inc. "There's got to be value."

Central to the Internet/intranet strategy Netscape unveiled here today is Communicator, a beefed-up Web client that goes "beyond the browser...to a whole new dimension in communication and collaboration," said Jim Barksdale, Netscape president and chief executive officer.

Communicator, priced from \$49 to \$79 and due out in the first quarter of next year, comprises Navigator 4.0, the latest version of Netscape's browser, as well as support for imaging, messaging, Web authoring and conferencing, scheduling and management.

On the server side, Netscape announced SuiteSpot 3.0, the latest version of its Internet standards-based server suite. New and updated servers include Enterprise Server 3.0, the latest

version of Netscape's publishing and document management server. Other new servers are Collabra Server 3.0, Calendar Server 1.0, Media Server 1.0, Messaging Server 3.0 and Proxy Server 2.5. SuiteSpot servers will be priced at \$995 each.

Communicator and SuiteSpot offer the completeness, ease of use and low cost that will appeal to corporate customers, particularly if they do not already have a groupware system in place, said Nina Lytton, president of Open Systems Advisors, a Boston-based consultancy.

Even with migration tools, an established Notes or Exchange shop is not likely to toss out existing applications overnight, Lytton said. But a company could still use Netscape's products to build new applications for busi-

ness procedures that have yet to be automated. "It is in some ways easier for people to get going with Collabra than it is with Notes," Lytton said.

Netscape does not seem to be focusing a lot of attention on mobile clients, giving Notes a boost in organizations that have lots of mobile users, said Eric Brown, an analyst at Forrester Research, Inc. Notes' multiprotocol support also gives it an edge in companies that have yet to standardize on TCP/IP, although that gap should close within the next

year or so as intranets become more common, Brown said.

For more information, call Netscape at (415) 254-1900.

Kalin is a correspondent for IDG News Service's Boston bureau.



Netscape's Barksdale says that Communicator goes "beyond the browser...to a whole new dimension in communication and collaboration."

Citrix opens browser 'Windows'

By Christine Burns
Coral Springs, Fla.

Citrix Systems, Inc. last week claimed neutrality in the browser war by giving both Netscape Communications Corp. and Microsoft Corp. customers access to Windows applications via the World-Wide Web.

HTML Web pages directly from the browser. Citrix already offers a similar Web client for Microsoft's Internet Explorer that Microsoft has licensed for inclusion in that product.

According to David Weiss, director of product marketing at Citrix, this product allows administrators to deploy existing business-critical Windows applications over a corporate intranet unaltered.

"This is a significant shortcut to accessing the mature Windows world," said Audrey Apfel, a research director with Gartner Group, Inc. in Stamford, Conn.

"On the front end, you get to run the applications without leaving the browser. And on the

See Citrix, page 10

PROFILE: CITRIX SYSTEMS

Founded: 1989

Headquarters: Coral Springs, Fla.

Primary product: WinFrame multiuser remote application server

Partners: Microsoft, Netscape and Sun

The company rolled out client software that plugs into Netscape's Navigator and lets end users run Windows 3.X, Windows 95 and Windows NT applications embedded in or linked to

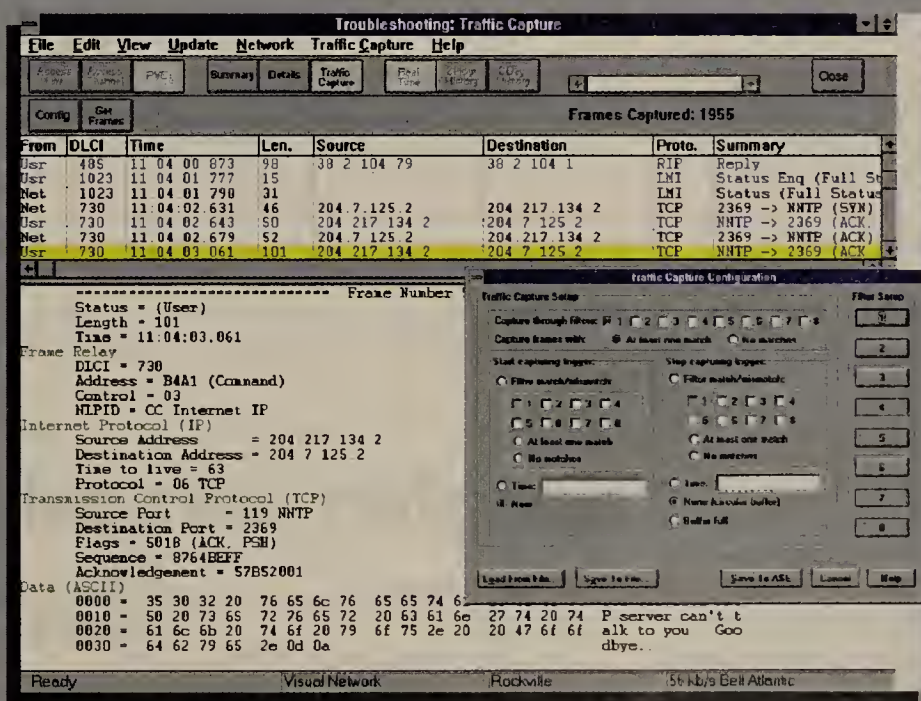
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Circle Reader Service #30

U.S. Robotics speeds Internet access by 50%

By Tim Greene
Skokie, Ill.

More than 30 Internet service providers last week rallied around U.S. Robotics, pledging support for emerging 56K bit/sec modems.

The high-speed technology promises Internet access that is about 50% faster than what customers can get with today's top-of-the-line modems and about the same speed as a single channel of ISDN access.

DOUBLE YOUR INTERNET PLEASURE

The 31 Internet service providers that have agreed to use U.S. Robotics' 56K bit/sec analog modem technology include:

- ▶ America Online
- ▶ Prodigy
- ▶ IBM Global Network
- ▶ MCI
- ▶ CompuServe
- ▶ Netcom

"Supporting faster modems will give ISPs a competitive advantage, and will be a key factor in encouraging users to migrate to even higher speed access," said Kieran Taylor, a broadband consultant with TeleChoice, Inc. in Verona, N.J.

U.S. Robotics is one of several modem makers with plans to move up to 56K bit/sec, and the ISP endorsements are important to the company's efforts to make its technology the 56K bit/sec modem standard. Field trials of the new technology start as early as next month with some ISPs.

Still, most observers expect a standards decision is at least a year away. Meanwhile, users will have to make sure they call a compatible modem or plan to connect at a slower speed.

One reason customers might be inclined to go with U.S. Robotics is that its 56K bit/sec modems will rely on software for their extra horsepower. In some cases, this means current U.S. Robotics gear can be upgraded with a simple software download that can be performed remotely.

The modems offer lopsided bandwidth, more downstream — toward the user — than upstream. With the U.S. Robotics modems, the balance will be 56K bit/sec down and 28.8K bit/sec up. The downstream source has to be digital.

Some U.S. Robotics modems will require swapping out a chip to upgrade them, and older

models will not be upgradable.

Software to upgrade simple modems will be available in January, and upgrades for modem pools and access servers will be ready in February. Prices for the modems and ISP services were not available.

Other vendors have said they would offer 56K bit/sec modems based on a new chip being developed by Rockwell International Corp. (NW, Sept. 16, page 14).

With 56K bit/sec approaching the bandwidth of one 64K bit/sec ISDN B channel, and with some ISPs offering ISDN access over only one B channel, users that want more bandwidth may forego ISDN. The switched digital service is not only more expensive than an analog phone line, but it is

more complicated to set up and requires more gear. "More than a few people might be dissuaded from buying ISDN," Taylor said. But ISDN will still have a following from those who need up to 128K bit/sec that a Basic Rate Interface ISDN line can offer.

©U.S. Robotics: (847) 982-5010.

Security

JavaSoft caves in to government pressures

By Ellen Messmer
Mountain View, Calif.

After intense government pressure, Sun Microsystems, Inc.'s JavaSoft division has woken up and smelled the coffee.

Sun had planned to ship its Java Development Toolkit (JDK) 1.1 with encryption APIs last spring, but the U.S.'s top-secret spy agency, the National Security Agency (NSA), put up a fuss, refusing to let a Java tool kit supporting encryption out of the country. Sources in the JavaSoft division said they are now caving in to NSA pressure and plan to release JDK 1.1 without encryption APIs.

"We have to ship source code overseas," said a JavaSoft source, who said the division cannot afford to fight the government on the security issue any longer.

"So you can see the direct effect of the government's encryption policy," the source added.

In addition, JDK 1.1 was supposed to include digital signatures based on RSA Data Security, Inc. algorithms. However, due to licensing disagreements with RSA, JDK 1.1 is instead likely to ship with the

government-approved Digital Signature Standard.

David Spenhoff, JavaSoft's director of product marketing, declined to discuss the changes in the digital signature and encryption, but acknowledged Sun was in discussion with U.S. authorities on the matter.

"There are a lot of changes at this moment at the government level," Spenhoff said. He added that JavaSoft is trying

to get a clear read on Vice President Al Gore's recent offer to let vendors export 56-bit encryption for two years if they support data-recovery features in future products.

Besides security, JDK 1.1 is also getting recast in other ways.

JDK 1.1 will now include a proprietary technology called the Remote Method Invocation (RMI) for letting Java applets and applications communicate across a network.

JDK 1.1 will also include

the ORB from Sun's Java/Common Object Request Broker Architecture developer product, Joe.

"Instead of opening a socket and sending a datastream, you use RMI," said Josef Decelie, engineer at Mitsubishi Electronics America, Inc., which is building Java-only business applications on a large scale. "We're planning on having a distributed Java application, and this is the natural way to communicate between client and server."

RMI delivers much of the same functionality as the client/server remote procedure call standard or the Internet Inter-Orb Protocol. "IIOP won't be in the JDK 1.1," Spenhoff clarified.

However, with RMI still in the alpha stage and changes occurring on the security front, it is questionable whether JavaSoft will make its year-end deadline for deliver-

ing JDK 1.1.

According to Spenhoff, JDK 1.1 may get pushed off into the first quarter of next year. ■



JavaSoft is trying to get a read on Vice President Al Gore's recent offer to let vendors export 56-bit encryption for two years if they support data-recovery features in future products.

Sync gives users end-to-end frame relay view

By Michael Cooney
Irvine, Calif.

Sync Research, Inc.'s recent purchase of Tylink, Inc. is about to bear fruit: new software for improving the management of large public or private frame relay networks.

Sync this week will announce it is adding Tylink's frame relay circuit management agent to its FrameNode 4200 frame relay access device (FRAD).

In addition, Sync is enhancing Tylink's network management applications to give customers an end-to-end view of their frame relay environment.

The company also is announcing a World-Wide Web interface to the application so administrators can pull up frame

relay net performance data and reports from anywhere on the 'Net.

Circuit management is key for customers trying to get a better handle on what traffic is flowing over individual frame relay circuits.

It also provides for real-time performance monitoring of FRADs and other frame relay gear.

"Large SNA frame relay users are used to complete visibility of their leased circuits, but with frame relay, there's no such visibility — until now," said Todd Krautkremer, Sync's vice president of mar-

keting.

In order to add this new capability, Sync will put one of Tylink's frame relay access probes (FRAP) inside its Frame-

Node 4200. The Intel Corp. 80486-based 4200 comes with a single token-ring or Ethernet LAN port, as well as eight WAN ports that can support speeds up to 2.048M bit/sec each. As many as 100 4200s can be stacked together.

The probe can feed frame relay circuit data such as errors, throughput, congestion and frame relay flow conditions on a circuit-by-circuit basis to an enhanced version of Tylink's TyView Performance Manager.

The application runs on Hewlett-Packard Co's OpenView or Sun Microsystems, Inc.'s SunNet Manager. A version for IBM's Tivoli TME 10 package is expected next year, according to Krautkremer.

Also on tap is a more intelligent agent for the FrameNode that will add

Remote Monitoring support and enable users to install, configure, diagnose, test and monitor response times more effectively, Krautkremer said. This agent will not be available until late 1997.

The FrameNode software supporting the FRAP will be available by January as a free upgrade for existing customers. TyView Performance Manager will be available at the same time starting at \$10,000.

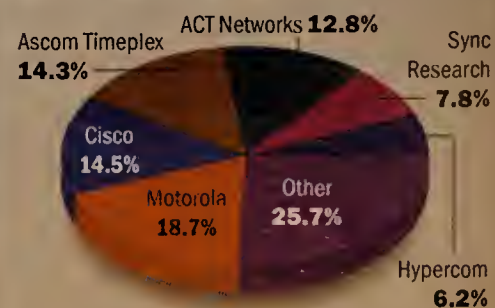
©Sync: (714) 588-2070.

SNA TAKES A FIFTH

SNA represents about 20% of frame relay traffic, according to a report by International Data Corp. in Framingham Mass.

IN SYNC

Sync Research was in the middle of the pack for 1995 worldwide FRAD revenues.



Based on total of \$192.6 million.
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Company _____

Address _____

City _____ State _____ Zip _____

Business phone (_____) _____

Business FAX (_____) _____

Internet e-mail address _____

If there is a parent company, please provide name: _____

1 Industry: (check one only)

- | | |
|---|--|
| 01. ☐ Manufacturers (other) | 12. ☐ Government (Federal/State/Local) |
| 02. ☐ Finance/Banking | 13. ☐ Military |
| 03. ☐ Insurance/Real Estate/Legal | 14. ☐ Aerospace |
| 04. ☐ Health Care Services | 15. ☐ Consultants (Independent) |
| 05. ☐ Hospitality/Entertainment/Recreation | 16. ☐ Carriers/Interconnects |
| 06. ☐ Media/TV/Cable/Radio/Print | 17. ☐ Manufacturers (Computer/Communications) |
| 07. ☐ Retail/Wholesale Trade/Business Services | 18. ☐ Resellers of Computer/Network Products (VARs, VADs) |
| 08. ☐ Transportation | 19. ☐ Systems/Network Integrators |
| 09. ☐ Utilities | 20. ☐ Distributors (Computer/Communications) |
| 10. ☐ Education | 21. ☐ Other (please specify) _____ |
| 11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry) | |

2 What is your job function? (check one only)

- NETWORK IS MANAGEMENT:**
- | | |
|---|--|
| 1. ☐ Networking Management | 5. ☐ Engineering Management |
| 2. ☐ LAN Management | 6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management) |
| 3. ☐ Datacom/Telecom Management | 7. ☐ Consultant (Independent) |
| 4. ☐ IS, IT, MIS, Systems Management | 8. ☐ Other (please specify) _____ |

3 What is the estimated value of networking equipment and services that you help specify, recommend or approve? (check one only)

- | | | |
|--|--|--|
| 01. ☐ \$100 million or more | 05. ☐ \$10 mil. - \$19.9 mil. | 09. ☐ \$250,000 - \$499,999 |
| 02. ☐ \$50 mil. - \$99.9 mil. | 06. ☐ \$5 mil. - \$9.9 mil. | 10. ☐ \$100,000 - \$249,999 |
| 03. ☐ \$25 mil. - \$49.9 mil. | 07. ☐ \$1 mil. - \$4.9 mil. | 11. ☐ None of the above |
| 04. ☐ \$20 mil. - \$24.9 mil. | 08. ☐ \$500,000 - \$999,999 | |

4 What is the total number of sites for which you have purchase influence? (check one only)

- | | | |
|-------------------------------------|-------------------------------------|----------------------------------|
| 1. ☐ 100+ | 4. ☐ 10 - 19 | 7. ☐ None |
| 2. ☐ 50 - 99 | 5. ☐ 2 - 9 | |
| 3. ☐ 20 - 49 | 6. ☐ 1 | |

5 Are you involved in the purchase of and/or plan to purchase network products and services?

☐ Yes ☐ No

6 Check ALL that apply in Columns A and B:

- A. I am involved in the purchase of the following products/services:**
- B. I plan to purchase the following products/services:**

LOCAL-AREA NETWORKS

- | | |
|--|----------|
| A | B |
| ☐ 01. ☐ Local-Area Networks | |
| ☐ 02. ☐ Network Op. Sys. Software | |
| ☐ 03. ☐ LAN Storage/Backup | |
| ☐ 04. ☐ Optical LAN Storage/Backup | |
| ☐ 05. ☐ Disk LAN Storage/Backup | |
| ☐ 06. ☐ Tape LAN Storage/Backup | |
| ☐ 07. ☐ RAID LAN Storage/Backup | |
| ☐ 08. ☐ Network Test/Diagnostic Tools | |
| ☐ 09. ☐ Cables, Connectors, Baluns | |
| ☐ 10. ☐ UPS | |
| ☐ 11. ☐ Network Interface Cards | |
| ☐ 12. ☐ Peer-to-Peer LANs | |
| ☐ 13. ☐ SNMP Network Management | |
| ☐ 14. ☐ ATM Switches | |
| ☐ 15. ☐ Token-Ring Switches | |
| ☐ 16. ☐ Ethernet Switches | |
| ☐ 17. ☐ Remote LAN Access/Communications Servers | |
| ☐ 18. ☐ Superservers | |
| ☐ 19. ☐ File/Application Servers | |
| ☐ 20. ☐ Print Servers/Fax Servers | |
| ☐ 21. ☐ CD-ROM Servers | |
| ☐ 22. ☐ LAN Servers | |

INTERNETWORKING

- | | |
|--|----------|
| A | B |
| ☐ 23. ☐ Bridges | |
| ☐ 24. ☐ Routers | |
| ☐ 25. ☐ Bridge/Router | |
| ☐ 26. ☐ Gateways | |
| ☐ 27. ☐ Intelligent Hubs | |
| ☐ 28. ☐ Stackable Hubs | |

COMPUTERS/PERIPHERALS

- | | |
|---|----------|
| A | B |
| ☐ 29. ☐ Laptops/Notebooks/Sub-Notebooks | |
| ☐ 30. ☐ Micros/PCs | |
| ☐ 31. ☐ Minis | |
| ☐ 32. ☐ Mainframes | |
| ☐ 33. ☐ Workstations | |
| ☐ 34. ☐ Terminals | |
| ☐ 35. ☐ Printers/Network Printers | |
| ☐ 36. ☐ Cluster Controllers | |
| ☐ 37. ☐ CD-ROM | |
| ☐ 38. ☐ Fax/Modem Boards | |

REMOTE/WIRELESS COMPUTING

- | | |
|---|----------|
| A | B |
| ☐ 39. ☐ PDAs | |
| ☐ 40. ☐ PCMCIA Devices | |
| ☐ 41. ☐ Wireless Data Services | |
| ☐ 42. ☐ Wireless Data Equipment | |
| ☐ 43. ☐ Wireless LANs | |
| ☐ 44. ☐ Cellular Equipment & Services | |

INTERNET/INTRANET

- | | |
|---|----------|
| A | B |
| ☐ 45. ☐ Internet Access Service | |
| ☐ 46. ☐ Firewalls/Security | |
| ☐ 47. ☐ Web Servers | |

INTERNET/INTRANET (cont'd)

- | | |
|---|----------|
| A | B |
| ☐ 48. ☐ Web Browsers | |
| ☐ 49. ☐ Intranet Applications/Groupware | |
| ☐ 50. ☐ Search Retrieval Products (web crawler) | |
| ☐ 51. ☐ Internet Development Tools | |
| ☐ 52. ☐ Internet Commerce Tools | |

SOFTWARE/APPLICATIONS

- | | |
|--|----------|
| A | B |
| ☐ 53. ☐ Network Management | |
| ☐ 54. ☐ Systems Management | |
| ☐ 55. ☐ Security | |
| ☐ 56. ☐ Communications Software | |
| ☐ 57. ☐ Terminal Emulation | |
| ☐ 58. ☐ Word Processing | |
| ☐ 59. ☐ Operating Systems | |
| ☐ 60. ☐ Client/Server Applications Development | |
| ☐ 61. ☐ Database Management/RDBMS | |
| ☐ 62. ☐ Spreadsheet | |
| ☐ 63. ☐ Groupware | |
| ☐ 64. ☐ EDI | |
| ☐ 65. ☐ E-mail | |
| ☐ 66. ☐ Windows/Graphical User Interface | |
| ☐ 67. ☐ Multimedia | |
| ☐ 68. ☐ Graphics/DTP | |
| ☐ 69. ☐ Remote Access | |
| ☐ 70. ☐ Imaging | |
| ☐ 71. ☐ Server Suites (Back office, etc.) | |
| ☐ 72. ☐ Suites | |
| ☐ 73. ☐ Middleware | |
| ☐ 74. ☐ Document Management | |
| ☐ 75. ☐ Database Server | |
| ☐ 76. ☐ Site Metering Tools | |
| ☐ 77. ☐ Computer-Integrated Telephony (CIT) | |

WIDE-AREA NETWORK EQUIPMENT & SERVICES

- | | |
|--|----------|
| A | B |
| ☐ 78. ☐ Frame Relay Equip./Services | |
| ☐ 79. ☐ Modems | |
| ☐ 80. ☐ FT-1/T-1/T-3 Multiplexers | |
| ☐ 81. ☐ FT-1/T-1/T-3 Services | |
| ☐ 82. ☐ SONET | |
| ☐ 83. ☐ Inverse Multiplexers | |
| ☐ 84. ☐ SMDS | |
| ☐ 85. ☐ Asynchronous Transfer Mode | |
| ☐ 86. ☐ Diagnostic/Test Equipment | |
| ☐ 87. ☐ DSU/CSU | |
| ☐ 88. ☐ VSAT/Satellite | |
| ☐ 89. ☐ ISDN Equipment & Services | |
| ☐ 90. ☐ PBXs | |
| ☐ 91. ☐ Voice Mail/Response | |
| ☐ 92. ☐ Videoconferencing | |
| ☐ 93. ☐ Leased Lines | |
| ☐ 94. ☐ Switched Data | |
| ☐ 95. ☐ E-mail | |
| ☐ 96. ☐ 800/900/MTS Services | |
| ☐ 97. ☐ Virtual Networks | |
| ☐ 98. ☐ Outsourcing/Systems Integration Services | |
| ☐ 99. ☐ Education/Training Services | |

☐ 100 ☐ None of the above (1-99)

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7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:

B. The following network platforms are planned for purchase:

NETWORK PROTOCOLS

- | | |
|--|----------|
| A | B |
| ☐ 01. ☐ SNA | |
| ☐ 02. ☐ DECnet | |
| ☐ 03. ☐ TCP/IP | |
| ☐ 04. ☐ Novell IPX/SPX | |
| ☐ 05. ☐ APPC/APPN/LU 6.2 | |
| ☐ 06. ☐ NETBIOS | |
| ☐ 07. ☐ AppleTalk | |
| ☐ 08. ☐ NFS | |
| ☐ 09. ☐ IPv6 | |
| ☐ 10. ☐ SNMP/SNMPv2 | |
| ☐ 11. ☐ Other (please specify) _____ | |

NETWORK OPERATING SYSTEM

- | | |
|--|----------|
| A | B |
| ☐ 12. ☐ Microsoft (LAN Manager) | |
| ☐ 13. ☐ Novell (NetWare 2.X, 3.X) | |
| ☐ 14. ☐ Novell (NetWare 4.X) | |
| ☐ 15. ☐ Windows NT | |
| ☐ 16. ☐ Windows NT/Advanced Server | |
| ☐ 17. ☐ LocalTalk (AppleTalk) | |
| ☐ 18. ☐ Banyan (VINES) | |
| ☐ 19. ☐ IBM (LAN Server) | |
| ☐ 20. ☐ IBM (PC LAN Program) | |
| ☐ 21. ☐ Artisoft (LANtastic) | |
| ☐ 22. ☐ Digital (Pathworks) | |
| ☐ 23. ☐ Other (please specify) _____ | |

LAN ENVIRONMENT

- | | |
|--|----------|
| A | B |
| ☐ 24. ☐ 4M Token Ring | |
| ☐ 25. ☐ 16M Token Ring | |
| ☐ 26. ☐ Ethernet | |
| ☐ 27. ☐ Fast Ethernet | |
| ☐ 28. ☐ 100vg Any LAN | |
| ☐ 29. ☐ FDDI | |
| ☐ 30. ☐ LocalTalk | |
| ☐ 31. ☐ 10Base-T | |
| ☐ 32. ☐ ATM | |
| ☐ 33. ☐ Other (please specify) _____ | |

COMPUTER OPERATING SYSTEM

- | | |
|--|----------|
| A | B |
| ☐ 34. ☐ DOS | |
| ☐ 35. ☐ Unix/Xenix/AIX | |
| ☐ 36. ☐ OS/2 | |
| ☐ 37. ☐ OS/2 Warp | |
| ☐ 38. ☐ IBM MVS | |
| ☐ 39. ☐ IBM VM | |
| ☐ 40. ☐ Digital VMS | |
| ☐ 41. ☐ Macintosh | |
| ☐ 42. ☐ Windows | |
| ☐ 43. ☐ Windows 95 | |
| ☐ 44. ☐ NT | |
| ☐ 45. ☐ Solaris | |
| ☐ 46. ☐ Other (please specify) _____ | |

☐ 47. ☐ None of the above (1-46)

8 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE

- (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

9 What is the total number of LANs, workstations/nodes at this location/ in your organization?

At this location:

LANs

1. ☐ 5,000+
2. ☐ 1,000 - 4,999
3. ☐ 100 - 999
4. ☐ 50 - 99
5. ☐ 10 - 49
6. ☐ 1 - 9

Workstations/Nodes

- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

Entire organization:

LANs

1. ☐ 5,000+
2. ☐ 1,000 - 4,999
3. ☐ 100 - 999
4. ☐ 50 - 99
5. ☐ 10 - 49
6. ☐ 1 - 9

Workstations/Nodes

- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

10 Please indicate your involvement in developing/implementing Internet/ Intranet Technologies: (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ Implement
6. ☐ None

11 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

1. IBM

2. ☐ Amdahl
3. ☐ Cray
4. ☐ Hitachi
5. ☐ Unisys

Mainframes

- A - Installed** **B - Planned**
- ☐
- ☐
- ☐
- ☐
- ☐

1. IBM

2. ☐ Digital
3. ☐ Tandem
4. ☐ Unisys
5. ☐ AT&T GIS
6. ☐ HP
7. ☐ Data General

Minis

- C - Installed** **D - Planned**
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

What is the total number of Servers/Clients installed/planned: (USE NUMBERS ONLY)

E-AT THIS LOCATION

- | # | F-% with Internet Access |
|------------|--------------------------|
| 1. Servers | % |
| 2. Clients | % |

G-ENTIRE ORGANIZATION

- | # | H-% with Internet Access |
|------------|--------------------------|
| 1. Servers | % |
| 2. Clients | % |

Which of the following Servers/Clients do you have installed/planned: (CHECK ALL THAT APPLY)

	At this location:		Entire organization:	
	I-Servers	J-Clients	K-Servers	L-Clients
01. Power PC	☐	☐	☐	☐
02. Power Mac	☐	☐	☐	☐
03. Mac Other	☐	☐	☐	☐
04. Multi Processor Servers	☐	☐	☐	☐
05. P6	☐	☐	☐	☐
06. Pentium Pro	☐	☐	☐	☐
07. Pentium	☐	☐	☐	☐
08. 486	☐	☐	☐	☐
09. 386	☐	☐	☐	☐
10. 286	☐	☐	☐	☐
11. Risc	☐	☐	☐	☐
12. Other	☐	☐	☐	☐

1. FOLD HERE & MAIL TODAY



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2. FOLD HERE & MAIL TODAY



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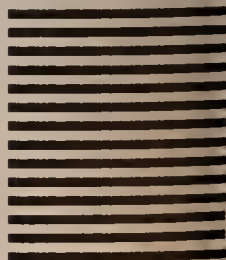
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Cisco-Cabletron rift raises IOS doubts

By Jim Duffy

Rochester, N.H.

Did Cisco Systems, Inc. only hurt itself by yanking Cabletron Systems, Inc.'s IOS license?

Cabletron and others said Cisco's ability to suddenly shut off access to its Internetworking Operating System (IOS) calls into question the openness of IOS. Cisco pulled the plug on Cabletron's license in response to Cabletron marketing tactics that Cisco felt sullied its image (NW, Oct. 14, page 1).

"Given this move by Cisco, the status of IOS as an open plat-

form, as well as the survival of other related Cisco industry partnerships, must be questioned," Cabletron said in a statement last week.

Cisco has been positioning IOS as a de facto routing standard for years.

"IOS is effectively being locked out — at Cisco's discretion — of over 60% of the [switch] market opportunity," said Michael Skubisz, Cabletron's director of product marketing.

To characterize IOS as open is folly because an IOS license requires a vendor to resell Cisco

hardware, Skubisz said. A company cannot license individual IOS components such as routing and switching protocols and add them to its own hardware, he claimed.

"If you call a power-sucking alien in another vendor's chassis 'licensing the technology,' there's a little sleight of hand going on," Skubisz said, referring to the Cisco hardware.

On the openness issue, analysts see Cabletron's point.

"It surprised me that Cisco cut them off like that," said Esmeralda Silva, a senior analyst at International Data Corp. in Framingham, Mass. "They're always saying how open IOS is. By doing this, it clearly shows that they can make it proprietary; everything's fine as long as you don't cross them."

Others see Cisco now using IOS as a key to get into wiring closets where Cabletron is king.

"They're going to use that to throw a little fear into users, say-

ing, 'Hey, Cabletron's not on our approved list anymore,'" said Skip MacAskill, senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. "When you own the corporate backbone, you can play that card."

Some IOS partners also see where Cabletron is coming from.

"If business issues cause a rift between Cisco's licensees and Cisco, then it could call into question whether this method of licensing IOS really does provide a multivendor environment," said Bill Burger, internetworking business manager at Digital Equipment Corp.

"It is not now an open solution for [Cabletron]," said Tom Hayes, director of marketing or workgroup products in 3Com Corp.'s integrated systems division. "[IOS] is clearly still within the control of Cisco."

3Com inherited Chipcom Corp.'s IOS license when it acquired Chipcom last year.

A licensee's competitive posi-

tioning vis-a-vis Cisco determines whether a license will be snatched, said Kirk Dunn, senior director of marketing at Network Equipment Technologies, Inc. "There's more of an underlying issue with respect to how Cabletron is approaching the market and what Cisco

views as possibly a threat," Dunn said.

Others say open or not, Cabletron violated a business arrangement and got what was coming to it.

"If you're in a partnership with someone, you really don't engage in that kind of behavior," according to Suzanne Crachy, product-line manager for Hewlett-Packard Co.'s 10Base-T workgroup internetworking gear.

Amen, Cisco said.

"Our partners specifically agree not to misrepresent our products and to portray Cisco in the highest professional manner," said Alex Mendez, vice president of marketing for enterprise networking at Cisco.

"This has to do with the simple fact that Cabletron has breached contract clauses that we have," Mendez said. ■



Cabletron's Skubisz says IOS is a "power-sucking alien."

Cisco snags NetSys for \$79m

Purchase raises questions about the direction of network management company's product lines.

By Jim Duffy

San Jose, Calif.

Cisco Systems, Inc. last week moved to acquire its 13th company, this time swallowing network management vendor NetSys Technologies, Inc. for \$79 million in stock.

NetSys makes network management and performance analysis software for Cisco-based router networks. These tools —

management product line, observers noted.

Analysts say the acquisition has its pros and cons.

"When you look at some of the issues around service levels, the acquisition of a modeling and design tool vendor like NetSys makes a great deal of sense," said John Morency, principal at Registry, Inc., a consultancy in Newton, Mass.

"But one of the major initiatives that NetSys was taking in 1997 was support for 3Com and Bay. There's an obvious conflict of interest," he said.

"Are they going to continue to update the product to reflect Bay routers? They hemmed and hawed on that one and finally came back

and said, 'Yeah, but probably not up to the level that we're going to support the Cisco products,'" said David Passmore, president of Decisys, Inc. in Sterling, Va.

Under terms of the purchase, shares of Cisco common stock will be exchanged for all outstanding shares and options of NetSys. Cisco expects the transaction to result in a onetime charge against after-tax earnings of between 5 cents and 6 cents per share in its second fiscal quarter.

NetSys' 50 employees, including Chief Executive Officer Herb Madan, will become part of Cisco's central engineering group, headed by Vice President Stu Phillips.

The deal is expected to be finalized in November. ■

PROFILE: NETSYS TECHNOLOGIES

	Based: Palo Alto, Calif.
	Founded: 1991
	Products: Enterprise/Solver network planning and problem-solving tools
	Financials: Privately held
	Employees: 52

used by more than 200 customers — are designed to simulate network designs to optimize capacity and performance.

NetSys' products can be launched from World-Wide Web browsers, a feature that dovetails Cisco's strategy to "Webify" its own management tools (NW, Oct. 7, page 21).

Cisco's intent in acquiring NetSys is to be the leading provider of Cisco router design and simulation tools for its vast installed base. Cisco has been reselling NetSys technology, and has held a minority stake in the company, since February 1995.

This arrangement, combined with its focus on Web-based management, gives Cisco a head start in integrating the NetSys tools with its CiscoWorks network

Internetworking

Bay puts stock into token-ring stackables

By Jim Duffy

Billerica, Mass.

Bay Networks, Inc. last week unveiled stackable hubs designed to spur a gradual migration by customers to higher performance switched infrastructures.

The company's BayStack Token Ring hub line is designed to extend the life of shared-media token-ring workgroups by integrating them with Bay's Centillion switches for microsegmentation and better throughput.

"Increasingly, companies are supplementing token-ring switching with token-ring passive hubs," said Thomas Nolle, president of CIMI Corp. in Voorhees, N.J. This differs from directly replacing hubs with switches, a strategy that can introduce management headaches involved with multivendor equipment deployments, he said.

A single BayStack Token Ring hub sports 24 RJ-45 ports running at 4M or 16M bit/sec that can be divided among four segments. Through a MultiRing

Expansion Module option, up to 12 of the hubs can be stacked to connect 288 users among 48 rings.

BAYSTACK TOKEN RING HUB HIGHLIGHTS

- ▶ Sports 24 RJ-45 ports running at 4M or 16M bit/sec.
- ▶ Supports four segments per hub.
- ▶ Can be stacked 12 high, to connect 288 users among 48 rings.
- ▶ Features Distributed Automatic Beacon Resolution for disabling a malfunctioning endstation within two seconds.

Users can switch ports among four backplane rings in the stack via Bay's Optivity LAN architect software.

A single BayStack network management module, which fits into an expansion slot on the BayStack Token Ring hub, can manage the entire 12-hub stack. Three management options are available, including four groups of Remote Monitoring (RMON)

and Management Information Base II support, up to full wire-speed RMON and RMON2-like application monitoring capabilities.

The BayStack hubs also feature a Distributed Automatic Beacon Resolution capability that disables a malfunctioning endstation within two seconds.

As an alternative to stacking, the hubs can be cascaded up to 100 meters apart to configure a single ring supporting 156 users, Bay said. This configuration does not require the MultiRing Expansion Module.

Media-dependent adapter modules support ring-in/ring-out connections over fiber and unshielded twisted pair. Fiber ports conform to the 802.5j standard for trunk and station attachments, which lets the BayStack hubs connect seamlessly to the Centillion 100, Bay said.

Finally, the BayStack Token Ring hubs support a redundant power supply option.

Pricing for the hubs starts at \$2,795. They are available now.

©Bay: (508) 670-8888.

Madge gets the videoconferencing picture

By Jodi Cohen
San Jose, Calif.

Madge Networks, Inc. last week attempted to jump-start the videoconferencing market with a suite of aggressively priced products that will work within existing LAN and WAN infrastructures.

The offerings deliver on the promise of integrated voice, video and data nets Madge made this summer with the

introduction of its MadgeOne architecture.

The company, best known for its LAN gear, has already rolled out voice products and is now rounding out their product portfolio with video equipment that will compete with products from the likes of videoconferencing specialists PictureTel Corp. and VideoServer, Inc.

Madge's offerings — which let custom-

ers set up a multipoint videoconference — include the VideoSwitch Multipoint Control Unit (MCU) video module for its WAN AccessSwitch, the VideoSwitch Express stand-alone unit and the VC Wizard Reservation System software.

Planned products — including a LAN video gateway and an inverse multiplexer — will let customers bring video communications into the net across the LAN and WAN.

Industry observers said other firms have MCU devices on the market, most of which cost from \$50,000 to \$100,000. Also, customers can get multipoint conferencing capability from service bureaus for about \$150 per hour per site.

But customers can get their hands on a Madge VideoSwitch package, which includes WAN access switching, inverse multiplexing, an eight-site MCU and net management software for \$38,700.

Analysts said aggressive pricing may help spur demand for video network gear, which so far has been relatively low.

"There are less than 200,000 videoconference systems in the United States right now," said Carl Howe, senior analyst at Forrester Research, Inc., a consultancy in Cambridge, Mass. "So video certainly isn't on the large scale of PCs or data networks, and it will take a while to catch on."

Jim Metzler, director of consulting services at Strategic Networks, Inc., a Boston-based consultancy, estimated that over the next few years, as many as 15% of desktop systems in corporate America may be video-enabled.

But Howe said he is not overly optimistic at the prospect of melding multiple technologies in to a single network.

"[Madge is] taking a stab at integrated voice, video and data," he said. "But so far, nobody has successfully blended voice and data and made a big business out of it. It's nice to have, but it's not a critical requirement."

©Madge: (800) 876-2343.

Madge's new videoconferencing gear

Product	Description	Price	Availability
VideoSwitch MCU	Module for existing WAN access switches that lets three or more parties participate in a videoconference	\$12,000	Now
VideoSwitch Express	Stand-alone unit that includes WAN access and switching, four-site MCU and net management software	\$9,995	Now
VC Wizard Reservation System	Conference software package that provides call control capabilities	Starts at \$7,000	Now
LAN video gateway	Connects between the LAN and ISDN infrastructure	TBA	First half of 1997
Entry-level inverse multiplexer	Connects a user to high-speed video networks	TBA	Q1 1997

TBA = To be announced

Lotus has Web applications for rent

By Barb Cole

Cambridge, Mass.

Lotus Development Corp. last week rolled out collaborative applications that will be available for rent from Internet service providers and other carriers offering public network-based Notes services.

The Domino Service Provider Applications (SPA) are aimed at small business users, remote workers and consumers who wish to exploit collaborative World-Wide Web sites but do not have the resources to build them or the inclination to manage them.

The applications are based on Lotus' Domino software, a free Notes server add-on that turns the messaging system into a Webserver.

The first application, Domino.Action SPA, builds an interactive Web site based on information users enter into a template.

Domino.Action SPA also handles billing and registering of participants.

Lotus is developing another SPA,

called Domino.Collaboration, for hosting private ad hoc discussions, document libraries, calendaring and more.

Domino.Action SPA will be available by year-end, and Domino.Collaboration

LOTUS AND FRIENDS

Lotus has relationships with 15 carriers offering Lotus Notes Public Networks, seven of which have commercially available services:

- ▶ BT
- ▶ CompuServe
- ▶ IBM Global Network
- ▶ Nippon Telegraph and Telephone
- ▶ Telstra
- ▶ US WEST
- ▶ Wolf Communications

is expected in the first quarter of 1997. The applications will support Web browsers and Notes clients. Pricing will be set by the service providers.

©Lotus: (617) 577-8500.

Citrix

Continued from page 6

back end, you just place a Windows icon on an HTML page, which gives end users access to anything that exists in the Windows world without having to deal with a new development paradigm like Java," Apfelsaid.

The WinFrame Web client for both browsers is based on Citrix's Intelligent Console Architecture (ICA) distributed Windows protocol. ICA allows an application user interface to execute on the client machine, consuming minimal resources there.

The application itself executes on Citrix's Windows NT-based WinFrame

multiuser application server.

Support for Citrix's Application Launching and Embedding technology in the WinFrame Web client and server enables 16- and 32-bit Windows applications to be published on HTML pages over the Web.

The beta code for the Navigator plug-in client is available on Citrix's and Netscape's Websites.

A licensing agreement between the two companies has not yet been announced.

The WinFrame Web client beta software for Explorer is distributed via Microsoft's Web site and comes with the Explorer Starter Pack.

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Masters of Networking: **ascom Timeplex**

X.500 marks directory spot

By Barb Cole

Santa Monica, Calif.

Isocor last week announced enhancements to its X.500 directory to help build employee address books that are accessible via the Internet and corporate intranets.

The company's retained X.500 directory, Global Directory Server (GDS), can now be accessed via Web browsers and has new replication features for distributing information across the enterprise.

The directory is aimed at companies looking to manage, update and replicate directory entries stored in messaging systems, databases and other applications with X.500-based directories.

The software can also cull information from Lotus Development Corp. Notes and cc:Mail and Microsoft Mail via Isocor gateways.

Apps development

Microsoft repository hits the beta stage

By John Cox

Redmond, Wash.

Microsoft Corp. has released beta versions of its long-awaited application development repository, along with information on interfaces that third-party tools can use to store and access information in it.

The Windows NT-based Microsoft Repository is a key part of the company's plans to help its biggest customers build large distributed applications from reusable software components. Repositories store a wide range of application information—including component definitions, business and data models, source code and HTML documents—and track the complex relationships among them.

"This repository will enable a much larger scale of [component] reuse by our big customers," said Jon Roskill, director of marketing for Visual Basic. "Some of them today have some reuse at the workgroup level. But there is no large-scale, cross-workgroup or enterprisewide information sharing [and reuse]."

The Microsoft Repository — being jointly developed with Texas Instruments, Inc. — has fallen behind the rosy time predictions initially made nearly two years ago (*NW*, June 3, page 1).

Roskill said the first implementation of the repository will be in Visual Basic 5.0, due in the first half of 1997.

Microsoft released the beta version last Friday to about 50 software and tool vendors.

Also released was detailed information about a new set of interfaces, based on Microsoft's Component Object Model, which are used for accessing the repository. ■

The new version supports replication through the Directory Information Shadowing Protocol, a key feature of the X.500 standard that allows directory information to be copied to remote sites.

The directory software includes the Global Directory Navigator, a Windows-based client application that allows administrators to remotely search the directory and modify entries. Several new utilities have also been added for backing up and restoring the directory database, managing log files and bulk-loading data into the directory.

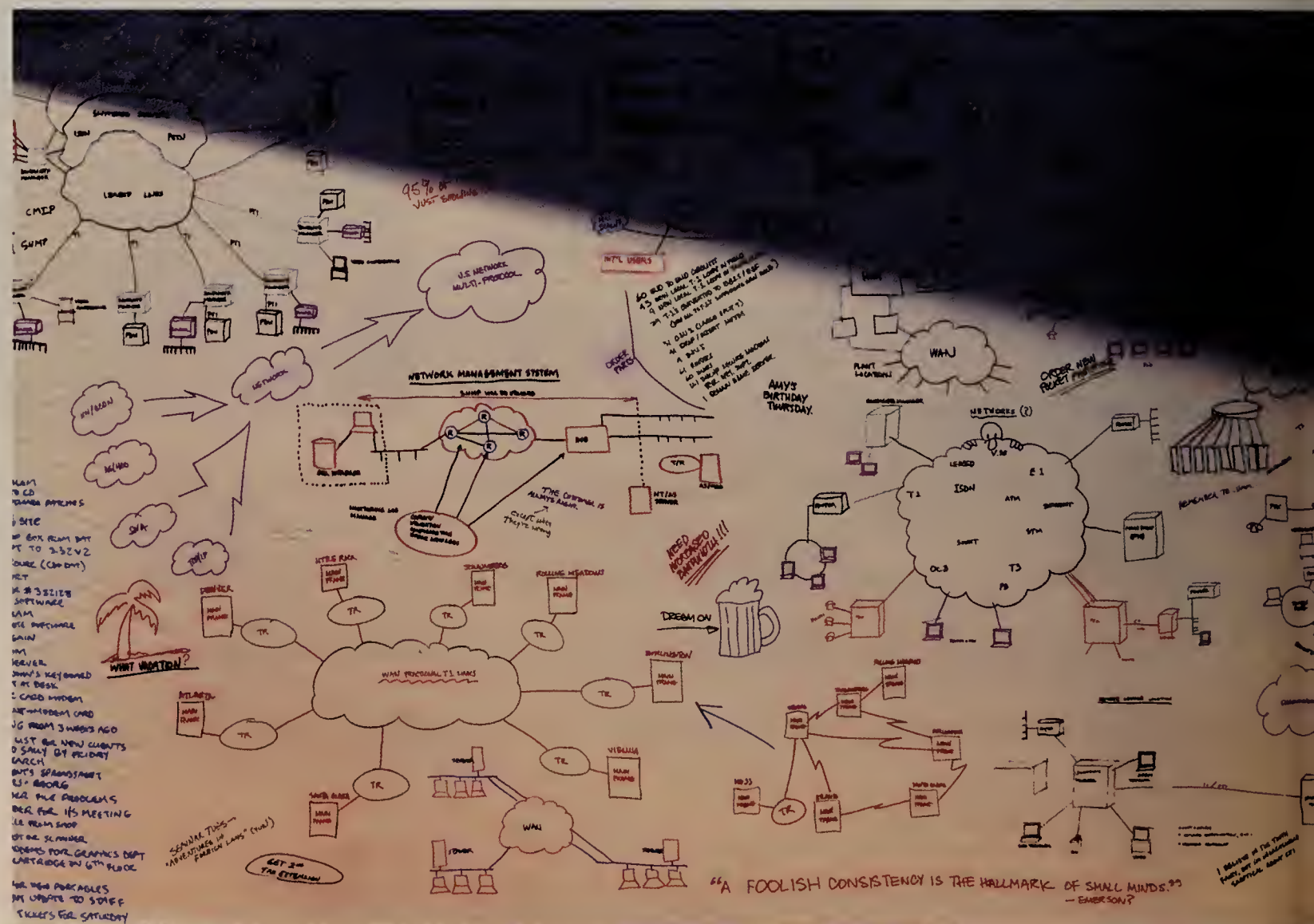
"[GDS] sounds like everything you need in one box to build an industrial strength directory," said Alexis Bor, vice chairman of the Electronic Messaging Association's directory committee.

GDS is available now on Unix and Windows NT. Pricing ranges from \$8,500 to \$17,350.

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SIEMENS

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AT&T widens range, shrinks price of switched offering

By Tim Greene
Bedminster, N.J.

AT&T is slashing prices and widening the availability of broadband ISDN with a newly expanded service called Switched T1.5 ISDN.

Users can bond as many as six 1.5M bit/sec ISDN lines and control them via a single ISDN signaling channel, giving users a flexible bandwidth alternative for heavy-duty applications.

The service, which was available before

from 17 AT&T points of presence (POP), starting today is available at 520 POPs.

"We could do more, but with 520 POPs, that's pretty much ubiquitous coverage," said Dick Slezak, managing director for AT&T's Global ISDN.

Even more impressive is the new pricing. Prices for 1.5M bit/sec ISDN links had ranged between \$1.03 and \$3.49 per minute, depending on time of day and mileage; they now range between 86 cents and \$2.31.

Those prices drop to between 48 cents and \$1.71 per minute if customers buy other services from AT&T.

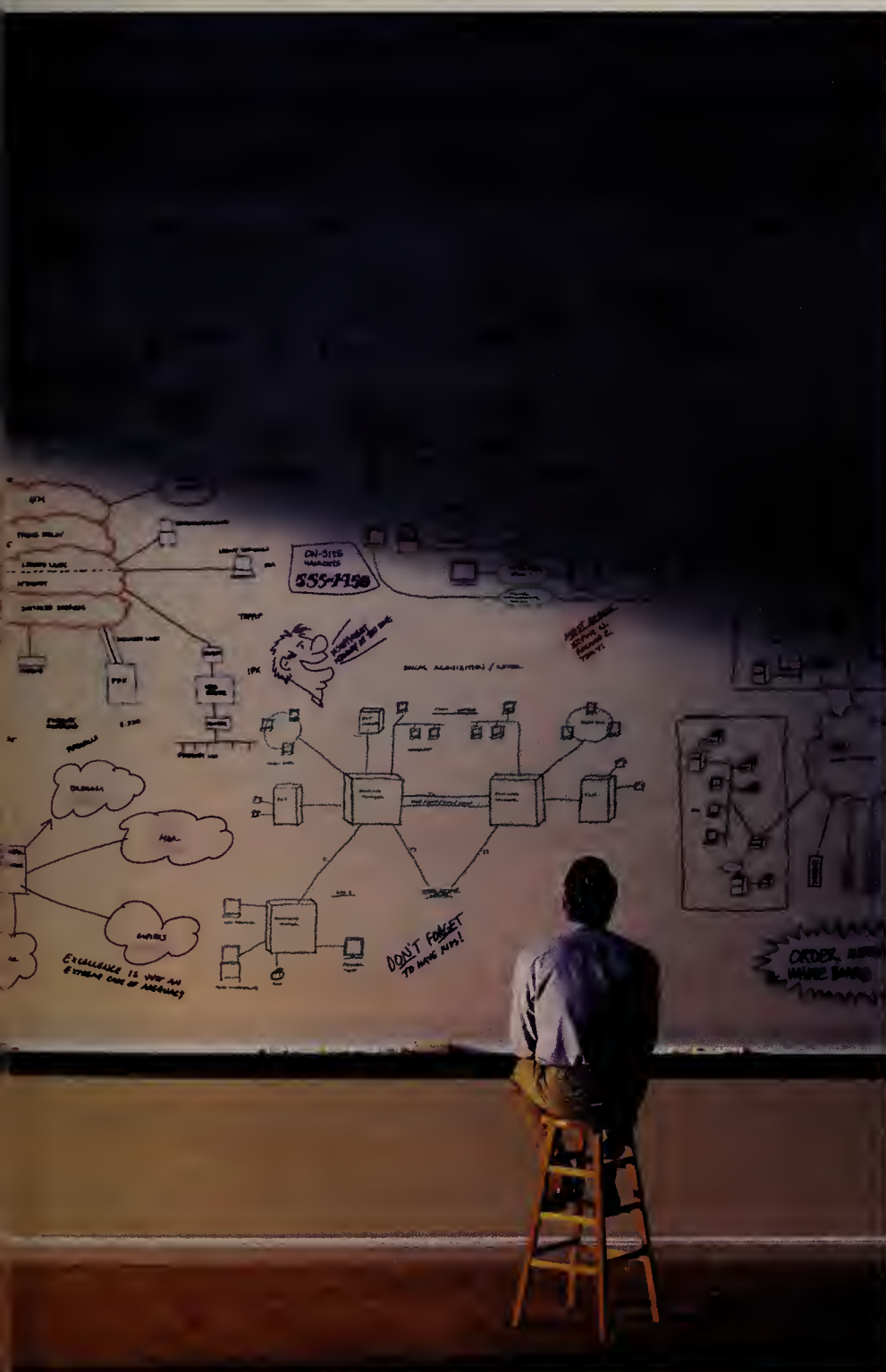
And users who spend \$200,000 or more per year with AT&T receive an additional 30% discount, according to the company.

Exact rates depend on the total amount of bandwidth used.

Len Elfenbein, president of Lynx Technologies, Inc., a consultancy in Fairfield, N.J., said the revamped offering will reshape the broadband ISDN field. "This will trigger a whole new dimension of use, and I think other carriers will follow with [broader] access and [lower] pricing," he said.

Jeffrey Fritz, telecommunications engineer at West Virginia University, which has an extensive ISDN network, said the rate drops were aggressive and welcome. "I hope the pricing will encourage the local exchange carriers to lower their ISDN rates," Fritz said.

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The 31 Internet service providers that have agreed to use U.S. Robotics' 56K bit/sec analog modem technology include:

- | | |
|----------------------|-----------|
| ▶ America Online | ▶ Prodigy |
| ▶ IBM Global Network | ▶ MCI |
| ▶ CompuServe | ▶ Netcom |

More POPs mean the local access to the service will also cost less because access links will likely be shorter, he said.

For occasional videoconferencing or periodic high-bandwidth applications, such as transfer of X-rays or prepress images, the switched service may be faster and more affordable than dedicated alternatives, Fritz said.

To bond together more than one T-1 requires customer premises equipment that is compatible with AT&T's network. Ascend Communications, Inc., Promptus Communications, Inc. and Premisys Communications, Inc. all make gear that has AT&T certification, an AT&T spokesman said.

AT&T has just finished a 14-month network upgrade to expand ISDN availability in its POPs.

Originally, that was scheduled to be finished next spring, but an accelerated schedule allowed earlier introduction of the extra POPs and new rates.

Elfenbein said other carriers offer the service, but it is expensive and not widely available. AT&T's new attitude could force them to change, he said.

Both the AT&T pricing and the increased number of POPs will make the service available to users that might have been forced until now to use slower or more expensive alternatives, Elfenbein said. ■

MainCon

Continued from page 1

tribution and problem management capabilities for everything from desktops to mainframes. In addition, the first MC/EMpower packages include a distributed database for storing and automatically tracking enterprise resources and file-transfer support.

If these claims sound familiar, they should. Computer Associates International, Inc., IBM's Tivoli Systems, Inc., Seagate Technology, Inc. and other management vendors have all promised to deliver integrated products in the next year or so that they claim can eliminate the expense, time and complexity of cobbling together multivendor end-to-end management systems.

"MainControl's uniqueness to the market is that its products will let users track the purchase of hardware and software from the beginning of a workstation's life cycle to the end," said Paul Mason, research manager for enterprise systems management at International Data Corp. in Framingham, Mass.

MainControl officials agreed. "Tracking a large enterprise with thousands of PCs and applications is getting too tedious to do by hand," said Alex Pinchev,

president and chief executive officer of MainControl.

MC/EMpower includes five applications and smart agents that run on IBM's MVS and OS/2 servers or Microsoft Corp. Windows 3.X and Windows NT workstations. Unix versions are expected in early 1997.

PROFILE: MAINCONTROL

Founded: 1994

Headquarters: Vienna, Va.

Primary business: Systems management software

Major partners: Boole & Babbage Europe and Axent Technologies

Funding: \$100 million from Formula, a software company based in Israel; \$6.3 million from various venture capital companies

Leadership: President and CEO Alex Pinchev was founder of Interchip, a \$20 million software company in Europe

Employees: 40

Users do not necessarily need to deploy MainControl smart agents, however, as MC/EMpower products work with other agents, such as those found in Intel Corp.'s LANDesk or Tivoli's TME10

environments.

Heart of the matter

At the heart of the MC/EMpower products is Enterprise Explorer. This object-oriented database includes an autodiscovery feature, which collects hardware and software information from agents in devices across the enterprise.

Enterprise Explorer's inventory information can be stored centrally on a large server or distributed among multiple servers. It also can feed data into other databases, such as those from Oracle Corp., Sybase, Inc. or IBM.

Explorer can also access and build into its inventory data from IBM's MVS-



MainControl's Pinchev wants to help users gain control of distributed resources.

based Resource Object Data Manager database. Working with Explorer, MC/EMpower's software distribution and file-transfer packages — SoftwareJet and DataJet, respectively — can determine where to send software updates and bulk file transfers.

The final component of MC/EMpower is ValueWise. It lets users track service-level contracts, depreciation schedules, vendors, suppliers and other administrative functions.

MC/EMpower products are available for prices ranging from \$20 to \$150 per seat, depending on the number of MC/EMpower applications customers need and the number of users.

©MainControl: (703) 749-2308.

MCI

Continued from page 1

clude wider protocol support, new addressing options and a usage-based pricing alternative to the current monthly flat-rate arrangement.

Those plans also call for an international version of the service, to be delivered next year by Concert, MCI's joint venture with British Telecommunications plc.

into frame relay or IP networks.

But most carriers — including MCI and AT&T — are now upgrading to equipment that allows users to dial directly in to a frame relay switch. Such moves should boost remote access service use over the next few years.

META Group, Inc., a consulting firm in Reston, Va., predicts the public remote services market will jump from \$1.2 billion this year to \$5.3 billion by the end of the century.

Advertisement

What Are ATM Forum Signalling Standards All About?



By Rob Rennison

Current ATM Forum signalling specifications provide procedures for dynamically establishing and clearing ATM connections. They can be grouped into User-to-Network signalling standards (UNI 3.0, UNI 3.1, and UNI 4.0) and Network-to-Network signalling standards (NNSP and PNNI 1.0).

UNI 3.0 was based on the ITU interim Q.93B standard. When Q.93B was ratified to become Q.2931, the Forum released UNI 3.1, based on Q.2931. One of the key differences between Q.2931 and Q.93B is that they both require different and incompatible versions of the data link layer protocol (SSCOP).

As a result, UNI 3.0 and 3.1 devices cannot be directly attached. For example, a UNI 3.0 adapter cannot be attached to a switch running only UNI 3.1 and a UNI 3.1 adapter cannot be directly connected to a switch running only UNI 3.0.

To ensure that UNI 3.0 devices and UNI 3.1 devices can interoperate with each other, switch vendors must provide both UNI 3.0 and UNI 3.1 signalling, a UNI 3.0 to UNI 3.1 interworking function and autodetection. Autodetection of the UNI version enhances interoperability, pre-

venting configuration conflicts between switches and adapters.

UNI 4.0 signalling provides additional capabilities beyond 3.x including: signalling of individual QoS parameters such as Cell Transfer Delay and Cell Delay Variation requirements.

UNI 4.0 also allows the signalling of new service capabilities defined in the Traffic Management 4.0 specification, such as the ABR and real time VBR service capabilities.

The IISP is an interim standard enabling equipment from different switch vendors to interoperate until implementations of ATM Forum PNNI signalling are readily available. Since no route propagation is possible over an IISP interface, static routes must be manually configured on both sides of the link.

PNNI signalling 1.0 is based on the UNI 4.0 protocol and provides mechanisms to signal over links which support the ATM Forum PNNI routing protocol. Additional capabilities include: source routing information, efficient rerouting of failed calls, and standards-based signalling for Soft Permanent Virtual Circuits and Paths.

Call 1-888-404-0444 for more information on this topic or visit our Website for the extended version of this article.

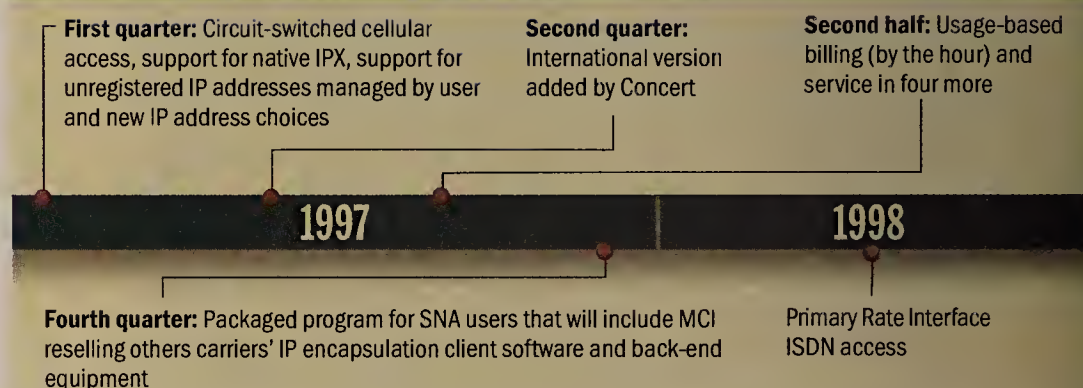


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ATM ISSUES ANSWERS

WHAT'S AHEAD FOR MCI'S REMOTE LAN DIAL SERVICE



This week, the company will add support for unregistered IP addresses that are assigned and managed by MCI, according to Robert Rasmussen, MCI's senior manager of access services product marketing.

Early next year, with the new architecture in place, MCI will be able to support unregistered addresses assigned by customers themselves.

That will also allow MCI to handle more IP addressing schemes. Early next year, for example, users should be able to get the same IP address each time they dial in, said Astrid Gintz, MCI product manager.

Today, they get a random address plucked from a series of addresses reserved for their company.

While the remote access equipment market has been soaring, remote access services from the likes of MCI, AT&T, CompuServe, Inc., LDDS WorldCom and Sprint Corp. have been slow in getting off the ground. That is largely because the services have relied on slow X.25 access

International extensions of the services will become particularly attractive to multinationals because long-distance calling in other countries "can cost several dollars a minute," said Dan Merriman, a director at Giga Information Group in Cambridge, Mass.

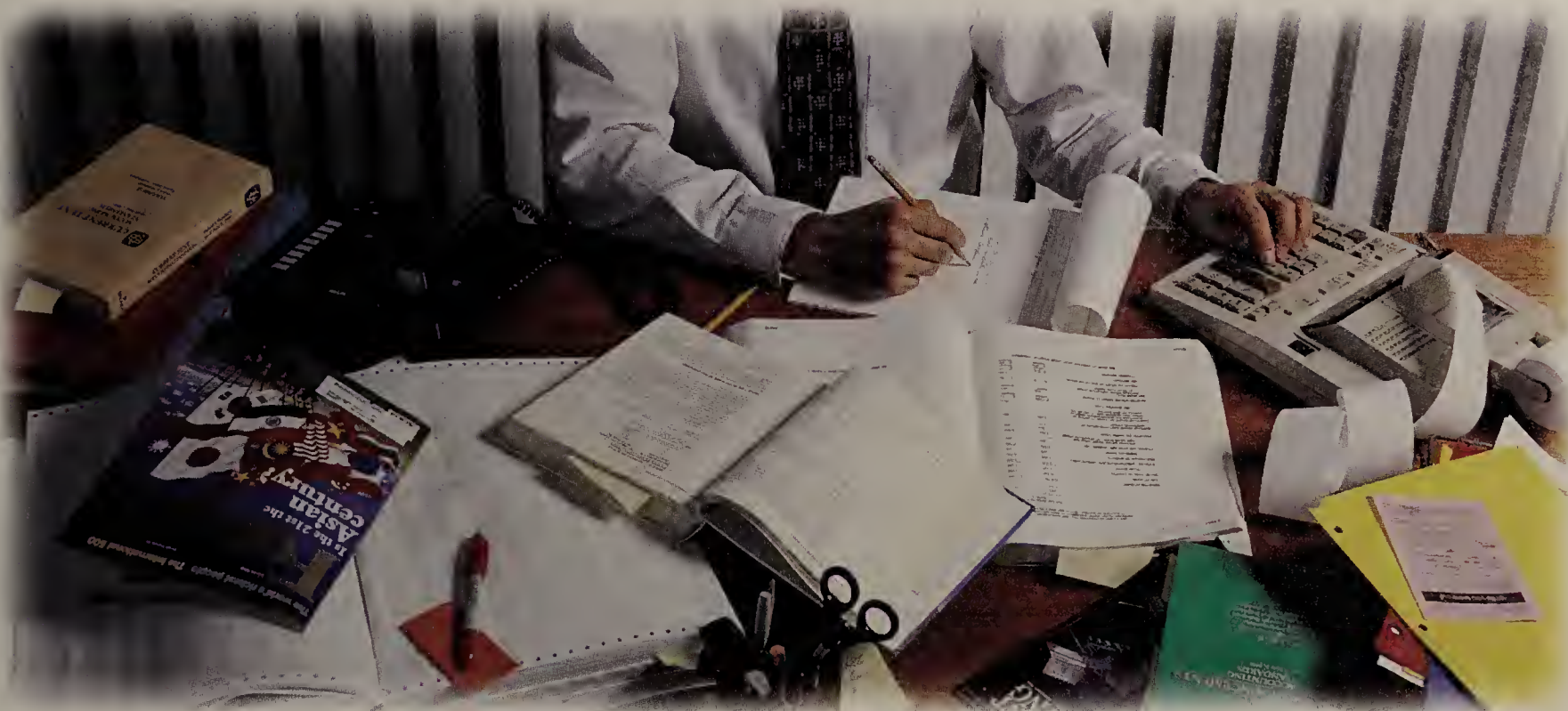
MCI's Rasmussen said the Concert version of Remote LAN Dial will offer local calling — rather than free-phone, 800-like calling — to keep costs down.

Analysts also expect that smaller companies, which do not want the hassles of running their own remote access networks, will embrace remote access services in growing numbers.

That market segment might like the usage-based pricing option. Today, Remote LAN Dial customers pay a flat \$3,000-a-month fee for supporting as many as 50 users, plus 800-number charges.

The new architecture will enable ports to be shared among multiple customers, allowing users to pay for the amount of time online, MCI's Gintz said. ■

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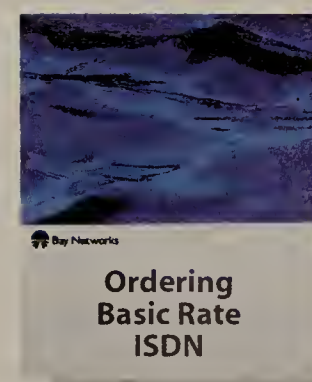
Dial-on-demand. Nautica ensures that the ISDN link is only activated when actual data needs to be sent.

In addition to these cost-saving features, the Nautica Series offers an integrated analog port, a WAN module which can support frame relay or leased lines, and Radius security support.

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Microsoft opens doors on 'Net store tools

By Ellen Messmer
Redmond, Wash.

Microsoft Corp. next week will take the wraps off its Merchant Server, an electronic shopping plaza that runs on top of its Windows NT Internet Information Server.

Merchant Server 1.0 lets retailers set up a single storefront or an entire mall on the Internet.

Buyers can do dynamic searches to find the selection and pick what they want to order, which is placed in an online shopping cart.

The total payment information, with tax and shipping, is provided by any back-end database that supports the Open Database Connectivity standard.

Most online shoppers browse merchandise anonymously, but Merchant Server can be set up to ask individuals to identify themselves and list their preferences.

"You don't have to require someone to identify themselves,

but you can," said Larry Gregory, a Microsoft systems engineer. Merchant Server tries to identify an anonymous shopper by filtering the shopper's IP address and other information available through the shopper's World-WideWeb browser.

This customer-identity filtering is done through a router in front of the Merchant Server via Microsoft's Internet Server Ap-

plication Programming Interface, according to Gregory.

"You can do special targeting of advertising, or who gets [price-count] promotions," he said. If you know the shopper has an anniversary or a family birthday in a few weeks, Merchant Server will be able to immediately present a recommendation to the online shopper, according to Gregory.

Merchant Server is based on the electronic storefront from eShop, Inc., which was purchased by Microsoft this year. It supports ActiveX, so online merchants can make use of Microsoft's component architecture as it matures.

Merchant Server also supports JScript, Microsoft's close approximation of Netscape Communication Corp.'s JavaScript.

According to Gregory, the Visa/MasterCard Secure Elec-

tronic Transactions standard for credit card encryption still seems to be undergoing changes, so Merchant Server is instead using Secure Sockets Layer for encryption.

When Merchant Server is launched, Microsoft's Web site msn.com will become the host site for eShop merchants Spiegel, Inc., Tower Records and others.

Wal-Mart Stores, Inc. is also expected to be there for the electronic ribbon-cutting. ■

Oracle lets users shop till they drop

By Elinor Mills
Redwood Shores, Calif.

Oracle Corp. last week announced products that will let companies set up store-fronts on the Internet, receive orders and handle payment transactions, as well as conduct business-to-business commerce online.

Oracle's Java-based Merchant Server, code-named Apollo, will include Oracle Payment Server,

which will process electronic payments from CyberCash, Inc., First Data Resources, Inc., VeriFone, Inc. and other vendors. Apollo also will allow merchants to track items selected by consumers and maintain shopper profiles.

Consumers can use Apollo to conduct searches for items based on keywords and themes. The server functions as a cartridge, or

application program, that inter-operates with Oracle Universal Server and plugs into the Oracle Web Request Broker. This links World-Wide Web servers to live applications and databases, and can generate HTML-formatted data in real time.

Apollo Merchant Server will be available for beta test before the end of 1996, and Payment Server as a stand-alone product will be available for beta test in the first half of 1997.

All of Oracle's new electronic

commerce products will be available for production use in the first half of 1997. No pricing was announced. Oracle also announced its Security Server, which uses digital certificate technology to allow for real-time transactions and authentication to access databases. Release 1.0 will be available by year-end.

For more information, call Oracle at (415) 506-7000.

Mills is a correspondent with IDG News Service in San Francisco.

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Briefs

■ **IBM** has announced new hardware and software server packages targeted at small business users. A new low-end, 64-bit, RISC-based Application System/400 Advanced Entry system is available for less than \$8,000. It can be used as a **World-Wide Web Server** and as a **PC LAN server** via an integrated PC Server board previously only found in IBM's larger AS/400 boxes. The IBM PC Server 320 Small Business Solution bundles an existing PC Server and 320 server software from IBM subsidiary Lotus Development Corp., as well as other server and client software to offer a complete turn-key package. It will sell for \$17,599, the company said. IBM: (914) 766-4530.

■ **IBM** last week announced a high-speed, high-capacity storage system for PC servers running OS/2, NetWare and Windows NT operating systems. The new 3527 SSA Entry Storage Subsystem for PC Servers employs the same Serial Storage Architecture IBM uses for large supercomputers and mid-range servers. Each 3527 holds up to five disk drives in hot-swappable bays for a total capacity of up to 22.5G bytes.

For more information, see IBM's Storage home page at <http://www.storage.ibm.com>.

■ **Dialogic Corp.** last week announced GlobalCall API, to be used by its products to simplify development for its **computer-telephony integration (CTI)** hardware components around the world. Dialogic said the API lets developers write an application for one country and port it to many others with minimal development effort because the interface shields them from low-level signaling protocol differences in each country.

Dialogic: (800) 755-4444.

Farallon taps hidden ISDN treasures

Upgrades to new line shoot for economy, ease of setup.

By Tim Greene
Alameda, Calif.

Farallon Computing, Inc. this week will introduce penny-pinching enhancements to its Netopia ISDN routers and modems that take advantage of vagaries in ISDN tariffs and bundle in extras.

Enhancements to Farallon's 412 and 612 ISDN modems for the Macintosh and PCs, respectively, let users send data over ISDN voice services, an option subject to lower tariffs in some regions than ISDN data services.

Modem upgrades also include 4-to-1 data compression, support for 230K bit/sec serial ports and automatic setup with the phone company's ISDN switch. Netopia now has two analog ports instead of one.

"They are definitely trying to establish a reputation for ease of use," said Pieter Hartsook, publisher of the "Hartsook Letter."

Router upgrades support an Internet dial-back option de-

signed to give the dial-up user with a Web page the appearance of a dedicated connection to the World-Wide Web.

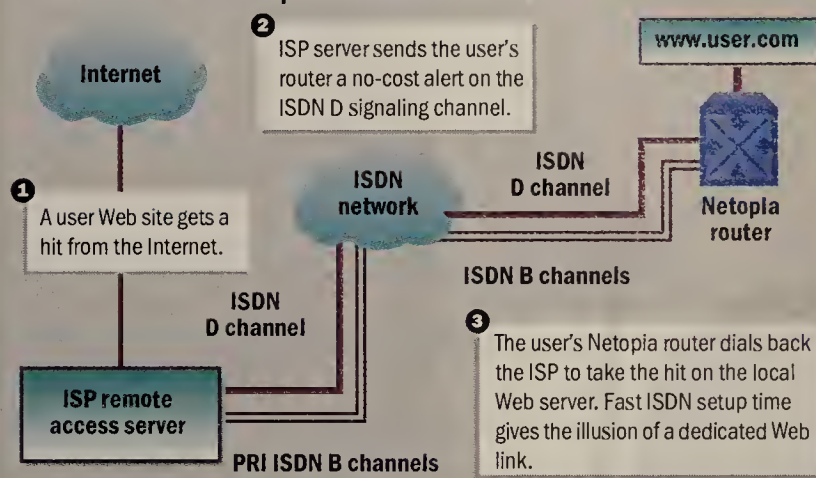
The company has also added security to the routers with source and destination call blocking. And, as it does for the modems, the company offers data-over-voice capability. That lets the user buy a flat-rate voice ISDN service but use it as a data service, which would usually be billed based on usage.

The routers now support IPX and a callback option present on ISDN access concentrators from Ascend Communications, Inc. and Cisco Systems, Inc. Ascend or Cisco boxes present at an Internet service provider site can contact the Netopia router via the ISDN D channel, which is used for signaling without incurring a charge for the ISP.

That D channel call tells the user's router the user has received an E-mail or a hit on its Web site. The router then calls

VIRTUAL WEB PRESENCE

Farallon ISDN Netopia routers work with other vendors' gear to offer users with Web servers dial-up connections to the Web.



back the ISP to connect to the user's privately owned Web server to take the hit or pull down E-mail.

The signaling and callback are done fast enough to approximate a dedicated 'Net link.

Farallon also offers a service option called Up & Running, Guaranteed for \$99, under which the company will order an ISDN line, get the user an ISP, configure the user gear and support the use with a toll-free help desk for a year. A three-year version, Netopia Care, Guaranteed, costs \$195 for the modems and \$295 for the routers.

Farallon said it designed the modems to match Bitsurfer ISDN modems from competitor Motorola, Inc. Farallon tried to develop its product with comparable features and meet Bitsurfer's \$495 list price.

The 412 and 612 modems are available now. The Netopia routers come in three models: the 630, for up to five users, supports IP and IPX and lists for \$749; the 440, priced at \$1,195, supports an unlimited number of Macintosh users; and the 640 supports unlimited IP and IPX users and costs \$995.

©Farallon: (510) 814-5023.

Network management

Tools target ATM, switched LANs

By Jim Duffy

Two network management vendors have rolled out new products that let users analyze remote ATM networks and gain greater visibility in switched LANs.

Net2Net Corp. unveiled CellBlaster LT, a scaled-down version of its CellBlaster ATM network analysis tool that can now provide detailed ATM diagnostics in a lightweight, laptop-size device.

Shomiti Systems, Inc. unwrapped new software for its Century LAN Analyzer that provides performance and functionality testing for hubs, switches, routers, bridges and adapters. Century LAN Analyzer software can now decode Cisco Systems, Inc.'s InterSwitch Link, Microsoft Corp.'s Server Message

Block and Digital Equipment Corp.'s DECnet Phase IV protocols.

Net2Net's CellBlaster LT is designed for use by the field operations staffs of corporations, educational institutions and other organizations. In addition to its laptop size, CellBlaster LT weighs only four pounds.

CellBlaster LT's predecessor, CellBlaster, weighs 22 pounds and is a desktop PC tower. That configuration will be targeted specifically at corporate data center networks. Net2Net expects to sell 10 times as many CellBlaster LTs as CellBlasters, company President Stephen McCalmont said.

CellBlaster LT supports all of the analysis features of its predecessor, but some beta users said there is room for improvement.

"They had problems identifying Layer 3 protocols once [our switch] was in [cut-through]

Let's get small

Features of Net2Net's CellBlaster LT

- ▶ Laptop-size and weighs four pounds
- ▶ Targeted at analysis and management of field operations networks
- ▶ Supports all CellBlaster features, including remote analysis
- ▶ Compatible with any Pentium-class laptop



mode," said Paul Esch, manager of the technical assistance center at Ipsilon Networks, Inc. in Sunnyvale, Calif. "They're taking a look at that."

CellBlaster LT costs \$19,995 and is available now.

Version 1.2 of Shomiti's Century LAN Analyzer software and tool kit are also available now. It includes two new features for performance and functionality testing: intelligent packet and capture file editing, and diverse traffic generation.

These capabilities allow users to capture traffic on a LAN and edit any part of the capture file through a template and menu-driven interface. The tool kit also lets users create custom test and troubleshooting scripts that operate independently or in conjunction with Century LAN Analyzers.

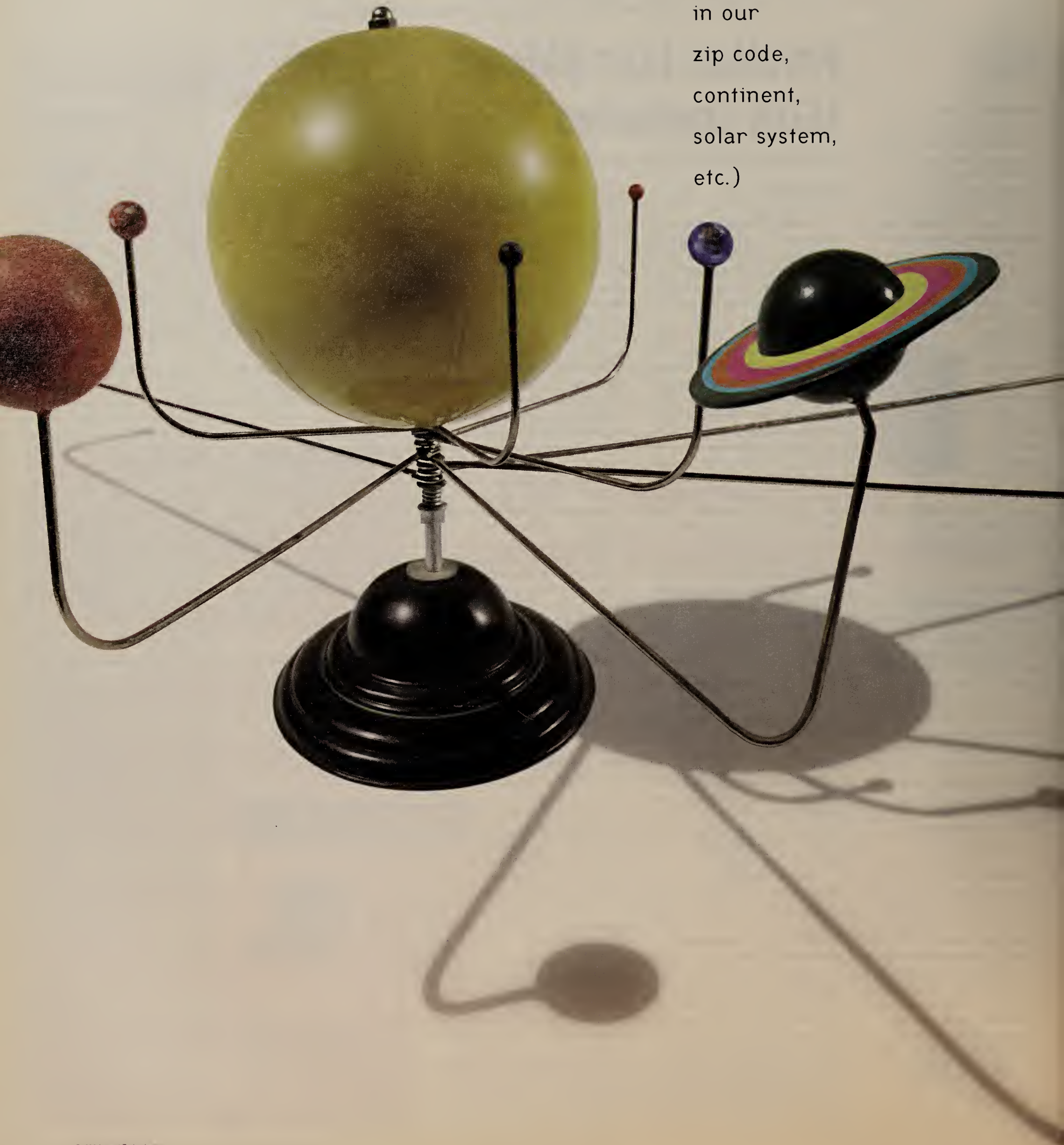
The tool kit also provides a suite of prewritten scripts for testing latency, throughput and packet loss rate across switched Ethernet and Fast Ethernet LANs.

Century LAN Analyzer 1.2 and the tool kit each cost \$999.

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Remote control

Microcom makes 'Carbon Copy' of 32-bit pcAnywhere

By Tim Greene
Norwood, Mass.

Microcom, Inc. last week introduced a 32-bit version of its remote control soft-

ware, Carbon Copy, that lets users simultaneously connect to as many as 256 PCs for training, collaboration or technical support.

Microcom's offering comes six months after rival Symantec Corp. issued its 32-bit remote control pcAnywhere32, and Carbon Copy 32 seems to be trying to dupli-

cate many of pcAnywhere32's key features (see graphic).

With the new capability, a user can connect to multiple other Carbon Copy 32 users and, for example, check systems configurations.

Other applications include training branch office or roving users by simultaneously demonstrating the use of new applications remotely.

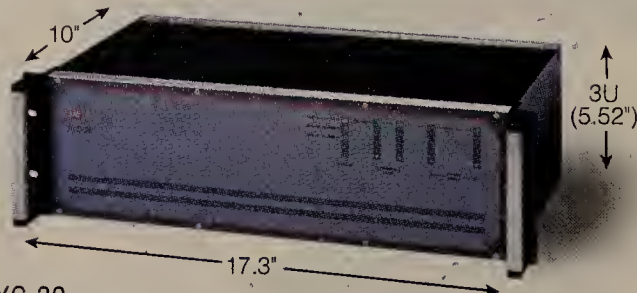
Carbon Copy 32 also supports simultaneous voice and data (SVD), which blends in with Microcom's OfficePorte Voice 33.6K bit/sec modem. SVD enables audioconferencing while users view related presentations on their PC video screens.

Carbon Copy 32 can be integrated with Netscape Communications Corp.'s Navigator and Microsoft Corp.'s Internet Explorer browsers via Carbon Copy/NET, which is both a Netscape plug-in and an ActiveX control for Explorer.

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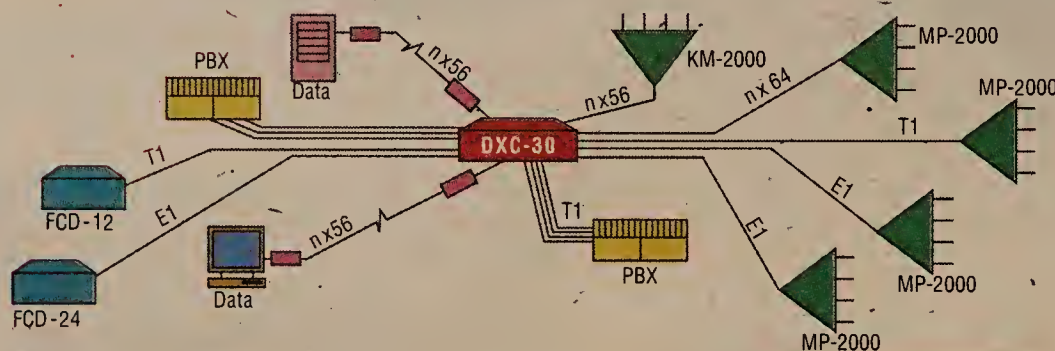


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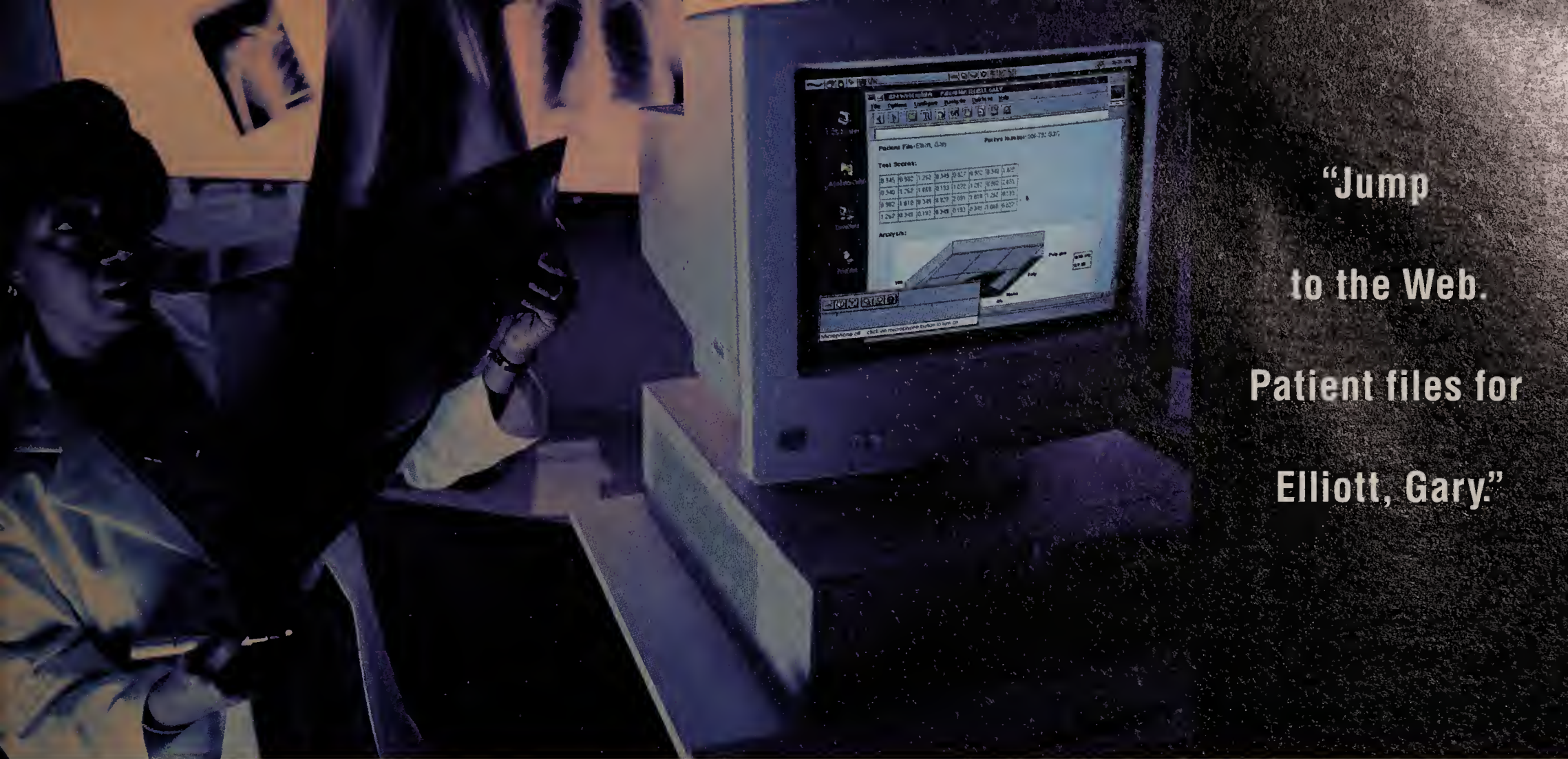
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COMMENTS?

See "How to reach us" on
page 6.



**"Jump
to the Web.**

**Patient files for
Elliott, Gary."**

INTRODUCING DESKTOP COMPUTING WITHOUT THE DESKTOP



I UNDERSTAND

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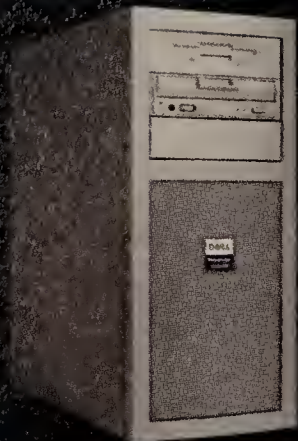
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Investment Banks Jump On Public Offering Of Dell Servers

3 of 4 Top Firms Report Improved Network Performance

Wall Street may be feeling a bit queasy, but it's definitely a bull market for Dell.

The Austin, Texas-based computer maker has scored a big hit among some of the largest investment banks with - of all things - its line of PowerEdge servers.

"It might seem surprising," said one source. "When people think of Dell, they think of desktops and portables. But Dell's adherence to open network standards makes their servers a natural on large corporate networks."

It also makes Dell unusual among its competitors, most of whom are only now beginning to abandon their proprietary standards in favor of a more open approach. "I don't want to name names, but companies like Compaq and HP are still



The following could be considered insider information. Run with it.

- Dell is ranked fifth in US server market share
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Web signals end of gateway world as we know it

By Michael Cooney

The multimillion-dollar SNA host emulation and gateway industry is being threatened by the rise of new Internet access gateways and Web browsers.

How quickly that threat becomes a reality, though, depends on the maturation of Internet-to-legacy application access technology and the willingness of some of the world's largest users to trust it to run mission-critical enterprise environments. That willingness also depends on SNA vendors devel-

change is made, the whole process has to be repeated. Still, combining these two divergent worlds will be no easy feat.

As if to punctuate the current market situation, traditional SNA gateway market players Attachmate Corp. and Wall Data, Inc. have been struggling financially this year. Attachmate even called itself the "Internet company" for a while, but lack of actual product delivery shot that moniker down earlier this year. And last week, Wall Data executives said they expect their third-

1.0 — not proven for use in most big mainframe shops," Suomalainen says.

But there certainly is interest. "We've been looking for an alternative to 3270 emulators for years, and it's still early yet, but if the browser technology proves to be the answer we've been looking for, I am all for it," says Ron Sanderson, manager of network software and support for the Illinois Department of Central Management Services in Springfield. "It's still way too early to deploy most of these [Internet-to-host] products in a production environment."

Any of the vendors looking to venture into this Internet-to-legacy application integration space have to be concerned with the scalability, performance and security of their products. Vendors need to prove to mainframe users that this is technology that can work, Villars says.

"Most host communications are sessions created by the terminal emulator and the host, not requests for pages like the browsers set up," Villars says. "There is a fundamental difference in how these things work."

Black magic

"It's not going to take black magic to do this because the technology exists today; but it's going to take time to make these products as reliable and robust as existing SNA products," added William Duncan, manager of enterprise communications software for IBM.

While those items may keep users on existing connectivity software for a while, the reasons to move away from it are just as compelling.

First, the Web is generally inexpensive. Browser software is free in many cases. For instance, Microsoft bundles its Internet Explorer with Windows 95. Plus, browser software generally does not require huge amounts of memory — another expensive consideration when rolling out hundreds of PCs in a large enterprise. And low-cost Internet access services are available in most places.

And there are training considerations, as well. Most host emulation packages require a lot

of end-user training, and no two packages are the same. Application navigation through a Web-based product is generally simple, and most browsers are remarkably similar. Plus, a browser interface to a 3270 application just has to be easier than a real 3270 screen, analysts say.

"It's a pure software administration savings because once the browser system is in place, applications can be added on the host, and the clients don't have to be

But network computer critics say users would be replacing one dumb terminal with another. Proponents counter that the network computers hold the power to access more resources for less money than a standard 3270 or 5250 terminal.

While some traditional vendors may struggle to survive in the Internet-to-legacy application integration world, others are already adapting to it. IBM, for example, will later this year add an HTML gateway product to its line of servers that converts 3270 or 5250 datastreams into HTTP. IBM will also provide direct 'Net access to its CICS transaction package and its DB2 database.

Polaris Communications, Inc.'s SNA Surfer package will enable users to set up large, fast pipes between remote desktops and corporate data residing on IBM mainframes. SNA Surfer works by converting any Microsoft Open Database Connectivity or other database requests from PC users into LU 6.2-based Distributed Relational Database Architecture queries that IBM DB2 databases can then process. SNA Surfer then sends the response back to the PC in an HTML format so it can be displayed on the browser.

Teubner & Associates, Inc. has also developed with Corridor, a software package for OS/2- and AIX-based servers that translates HTML calls into 3270 or 5250 datastreams and vice versa.

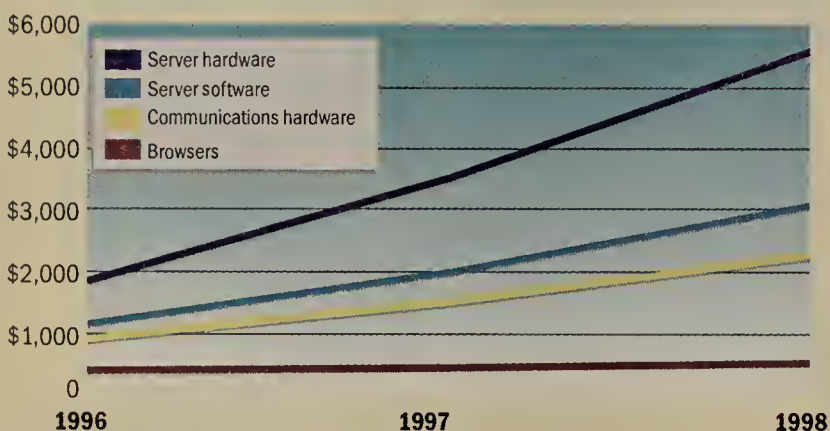
Other industry players such as OpenConnect Systems, Idea and Apertus all have legacy-to-Internet access products.

"These are just the first generation of products that in two or

MARKET EXPLOSION

Combined Internet/intranet markets

(In millions)



oping new or improved tools and bringing them to market quickly.

"It's clear that the 3270/5250 terminal emulation and gateway business is fading, and those vendors now are looking for a way to exploit the Internet with Web access and application development with Java technology," says Rick Villars, director of network software research at International Data Corp. in Framingham, Mass. "Those vendors will have to retool their products if they expect to successfully compete in the next few years."

The reason browsers and Web servers are drawing so much attention is that, for the most part, browser software is easier to install, configure and maintain than traditional emulators and gateways. Applications can theoretically be added and changed on a Web server with no impact on the clients. However, terminal emulation and SNA gateway software require turning on individual machines, lots of manual configuration and then, if a

quarter earnings to be less than expected, causing the company's stock price to plummet.

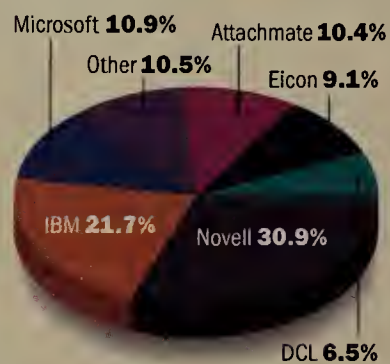
"Certainly, the vendors who have large, high-priced emulation packages, focused only on SNA, will suffer from the trend toward the Internet," says Vesa Suomalainen, general manager of Microsoft Corp.'s SNA Server product unit.

The short-term saving grace for most emulation or gateway vendors is that most corporate information still resides on SNA-based mainframes that are not directly accessible by most Web users. It is no easy task to retool millions of lines of code, and swap out thousands of existing software emulators and gateways, just to provide Internet access to a mainframe application. Plus, for most users, there is no business rationale for doing so, experts say.

"Mainframe users aren't the most aggressive in the world; and most of these Internet host access products are in Version

SNA GATEWAYS RULE ROOST

1995 worldwide SNA gateway software unit shipments



retooled. And all the keyboards will work — which can't be said when new SNA/terminal emulators are brought up," Villars says.

Browsers will also let users have access to SQL databases, such as those from Oracle Corp.'s, and other host resources without changes at the client level, Villars adds. Users are looking forward to the prospect of having a single package that will enable host emulation and 'Net browser capabilities.

Even the forthcoming network computers or "thin clients" from IBM, Oracle and others represent a threat to the gateway vendor community. For example, IBM executives now tout their Network Station as an "ideal replacement" for 3270 and 5250 terminals. The Network Station, priced at about \$700, runs a microkernel-based operating system and supports Java, Netscape Communications Corp. Navigator 3.0 and customized 3270/5250 connectivity packages for IBM host access.

Check out overviews of legacy/Web gateways.

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three years will potentially be big business," Villars says. "With extensions like Java and ActiveX, these products will become more interesting and powerful to users." ■

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In-Site

US Cellular rings up ATM

Switched infrastructure streamlines architecture.

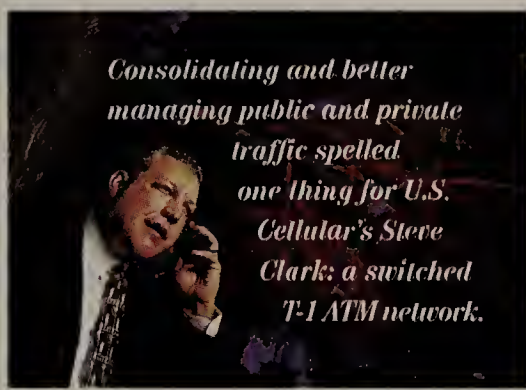
By Tim Greene
Chicago

US Cellular is in the midst of a forklift upgrade, trading time-division multiplexers for ATM switches and the efficiencies they bring.

In doing so, the carrier will ultimately integrate its corporate network with its commercial net-

By investing \$10 million in a switched ATM network, the carrier could consolidate its voice and data traffic from its commercial and corporate networks, and add video.

Plans call for US Cellular commercial cellular traffic from base stations to be switched over landlines to other broadcast sites in 1997 or 1998. The switches are linked by a mix of leased copper and fiber T-1 lines, and some microwave spans, which are good for voice but unfriendly to data, Clark said.



Consolidating and better managing public and private traffic spelled one thing for U.S. Cellular's Steve Clark: a switched T-1 ATM network.

Not enough traffic

So far, there is not enough traffic to warrant more than six inverse

work, and lash the whole thing together over T-1 and multiple T-1 leased lines.

That will save the company money, make its network more efficient and leave room to expand the network as business increases, said Steve Clark, director of network services for US Cellular.

It also shows how ATM, often thought of as just a high-speed solution, can be efficiently used on smaller links that fit more readily into corporate networks. With the capability to collapse multiple networks that carry voice and data separately, ATM also brings the ability to add new kinds of traffic, such as video, that are becoming more important in the corporate world.

Many corporate users may not be able to enter the ATM world on the sweeping scale US Cellular did with the purchase of its own private switching. But with the advent of T-1 ATM services from carriers, the benefits of ATM will soon be available to a wide range of users (NW, April 1, page 16).

US Cellular's business blossomed at a rate the company had to scramble to keep up with using its multiplexed landline network. "We were pretty hungry in terms of bandwidth," Clark said.

multiplexed T-1s between any two sites, falling short of the crossover point at which it would be less expensive to buy a T-3.

The network will carry signaling among 50 cellular voice switches as well as US Cellular corporate traffic, including constant bit rate voice and video traffic, and large file transfers.

Among the switch vendors US Cellular considered were Cascade Communications Corp., Northern Telecom, Inc., Network Equipment Technologies, Inc. and Cisco Systems, Inc.

Cisco's StrataCom switches had a leg up because US Cellular had already installed six StrataCom IGX switches as part of its backbone. But when it came time to pick a vendor, a lower overall price and StrataCom's scheme for dealing with network congestion won the day, Clark said.

He would not discuss the actual cost but said US Cellular looked at the up-front cost of buying and installing the boxes, as well as recurring maintenance costs over three years. Clark said the ATM investment should pay for itself in 12 to 18 months.

US Cellular found that the StrataCom boxes better defined and managed alternate routes and set them up faster to deal with network congestion than

the Nortel switches, according to Clark.

Nortel's way to improve its time to reroute traffic was to use a larger switch, he said. The company started installing StrataCom IGX switches March 1 and has installed 26 switches so far; 50 switches will be in by year-end.

The network has a fully meshed, two-tier architecture. A single national loop of 12 T-1 lines, each with a redundant backup, anchors six smaller regional loops that are also fully redundant. Each of the regional rings interconnects with the

national ring at two points, again for redundancy, Clark said.

The StrataCom boxes give US Cellular a way to scale up if necessary. The IGXs come in eight-, 16- and 32-slot models, with US Cellular buying mostly 16-slot versions. As the company grows, it can go to larger versions or pair switches, or even jump to the StrataCom 20G bit/sec core switch, Clark said.

But the architecture is good for at least five years. "I can't see any new requirements coming down the pike that need to be addressed," he said. ■

Internet telephony

'Net fax becoming way of PC life

By Joanie Wexler
Cambridge, Mass.

The 10 million users of WinFax Pro PC software will be able to send all their faxes over the Internet by the end of the month.

Symantec Corp.'s forthcoming WinFax Pro 7.5 will include a wizard that allows users to establish an account with NetCentric Corp., a start-up here that offers an Internet faxing service through a server platform it calls POPware (NW, April 22, page 16).

international ones."

Getting the Internet faxing service through a company's ISP would consolidate support and billing, Flemming said.

Any which way you choose

WinFax users can decide whether to use phone lines or the Internet each time they send a fax.

POPware accepts compressed and encrypted faxes from 'Net-connected users and then figures out which POPware host is closest to the fax's destination. The host routes it there over the 'Net and passes it off to the local telephone network for delivery. As a result, users save on the long-distance fees.

WinFax Pro users can fax from international locations to anywhere in the U.S. for 15 cents a page, the same price as faxing between two domestic locations. The international price could mean big savings — up to 80%, by NetCentric's estimates — for U.S.-based multinationals with international sites that do a lot of faxing to U.S. locations.

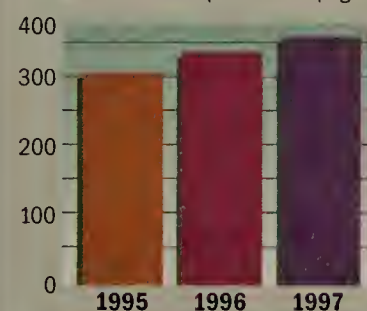
But the domestic price "is boring," said Peter Davidson, president of Davidson Consulting in Burbank, Calif.

His reasoning: At about a minute per faxed page, the price is on par with AT&T's new 15-cents-per-minute flat rate for long-distance calls, and it is higher than Sprint Corp.'s 10-cent price during off-peak hours. ■

STAYING POWER

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SOURCE: DAVIDSON CONSULTING, BURBANK, CALIF.

NetCentric, though, is attempting to sign up worldwide Internet service providers to host its POPware servers. So far, only Concentric Network Corp. in San Jose, Calif., has signed up, but John Flemming, NetCentric vice president of marketing, said POPware is being evaluated by "every major U.S. ISP and some

Briefs

■ **Bell Laboratories** has demonstrated a switching technology that could enable public networks based on Lucent Technologies, Inc.'s GlobeView 2000 ATM switch to handle a trillion bits of information, or a terabit, at one time. Today, GlobeView 2000 handles 20G bit/sec. Officials could not say when such an architecture might become available commercially. GlobeView 2000 forms the heart of AT&T's InterSpan frame relay and ATM network today, and is in use in several Bell operating company and international carrier nets. MCI Communications Corp. is also evaluating the switch, according to Lucent.

■ **AT&T** has asked the Kentucky public service commission to arbitrate its local market-entry negotiations with BellSouth Corp. and GTE Corp. AT&T began resale and interconnect negotiations with the two local service providers in May but, as with several of AT&T's other such local service negotiations, has not been able to successfully resolve operational and unbundling issues.

■ **AT&T** has filed a lawsuit charging **MCI Communications Corp.** with trademark infringement for its use of the marketing blurb "MCI True Rate," claiming that AT&T has full rights to the "True" name.

■ **Cascade Communications Corp.** last week set up a laboratory for carriers to test network service applications on Cascade switches and perform interoperability testing with other vendors' gear.

Cascade: (508) 692-2600.

■ **Users who buy AAC Corp.'s Account-A-Call service** to keep track of outgoing PBX traffic can now access it via the **World-Wide Web** rather than dialing up to access the data. AAC will continue to offer a dial-up option for users to access the data.



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Lots of data, how much information?

If you are a frame relay user seeking monthly performance reports to help you make decisions about designing and sizing permanent virtual circuits (PVC), we have some good news and some bad news. The good news is that more and more service providers are rolling out customer network management services, and some of the services are even Web-based.

The bad news is that many of the reports provide a lot of raw data but do not offer customers the information they need to make network sizing and optimization decisions.

LDDS WorldCom just introduced the first Web-based frame relay management reports. Ameritech Corp. is beta-testing a Web-based service, and AT&T, MCI Communications Corp., Sprint Corp. and US WEST, Inc. offer hard-copy performance reports and SNMP access.

Some carriers allow you to access the information directly off the frame relay switch. Others design the system so that you go through a centralized database. There are pros and cons to each approach, but the biggest difference is that a central repository can impact the "newness" of the information as it tends to be 15- to 60-minutes old when it becomes available.

Because utilization information is usually used for planning purposes, this probably isn't a big problem. And AT&T and others offer real-time SNMP-based alerts in the event of a PVC or port alarm.

Among other things, monthly frame relay performance reports generally include the average utilization on the PVCs as a percentage of the committed information rate (CIR).

All of this sounds great, and it is. So what's the bad news?

If you look at the PVC utilization reports for your network, you will probably see a relatively low average utilization rate, maybe 20% of CIR or even less. You might mistakenly conclude that the network is overdesigned and that lower CIRs could be used to save money. Makes sense, right? Not exactly.

Unfortunately, there is a flaw with these reports because the utilization is typically measured over a 15-minute interval, too long to provide useful information to determine the optimal CIR level for bursty and intermittent applications.

Today's PVC reports are more useful for giving customers an idea of the busy traffic periods. This can be helpful when

making decisions about the best time to send traffic that is not mission critical or to back up files over the network.

Because the service provider's frame

relay switches were not designed to produce reports that provide this more granular information, getting these measurements will probably require use of an outside device. There are some devices on the market now that walk, smell and bark like a sniffer, but cost a lot less. With these devices attached to the network at each location, you can get very detailed infor-

mation about your network.

Now how about some help translating all the information into recommendations for network optimization?

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. Contact them at dbriere@telechoice.com and checkart@telechoice.com.



Daniel Briere and Christine Heckart



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Briefs

■ **Artisoft, Inc.** has outlined a road map for its **LANtastic** net-working product that includes shipping a version for Windows NT by mid-1997.

The company, headed by President William Keiper, is also planning to work telephony and communications support into its products.



Keiper

Company officials said this will give customers a voice and data infrastructure that can support applications like

voice mail, automatic call distribution and Internet E-mail. The new features will be added next year.

Artisoft: (800) 233-5564.

■ **IBM** has announced two hardware/software server packages targeted for small business use.

The **PC Server 320 Small Business Solution** ships with a 15-user license of Novell, Inc. NetWare 4.1 and includes remote network access and productivity software for calendaring, E-mail, word processing and groupware applications. The package is available now with prices starting at \$12,070.

The new **AS/400 Entry** will run Version 3.7 of the RISC-based Application System/400 operating system and will include DB2 for AS/400, fax, wireless LAN support and advanced printing services. The product will be available in November and start at \$7,995.

IBM: (800) 426-2255.

■ **Case Technology**, formerly Cray Communications, last week announced **Layer 3 switching** capabilities for its MatchBox Ethernet switch. The backbone switch delivers high-performance routing capabilities of up to 70,000 packet/sec forwarding rate without affecting the device's Layer 2 switching performance. The Layer 3 switching software will be available in December as a free upgrade.

Case: (800) 227-3134.

Novell poised to push out NetWare 3.X

IntranetWare's Web features, directory tools are good reasons to make NetWare 4.X move.

By Christine Burns

Four could turn out to be a lucky number for Novell, Inc. in getting its dyed-in-the-wool NetWare 3.X users to migrate to the company's latest release.

IntranetWare — a bundle including NetWare 4.11, Novell Web Server 2.5, an IP/IPX gateway and File Transport Protocol services — is the fourth iteration in the NetWare 4.X line since it was released in April 1993. IntranetWare hit the streets two weeks ago, and customers that have traditionally clung to their 3.X servers are taking a serious look at Novell's new bundle-in-a-box.

Chuck Klucko, a systems engineer at Goldco Industries, Inc. in Loveland, Colo., is planning to make the jump to NetWare 4.11 this spring, largely because more software vendors are writing off-the-shelf business applications for the upgraded operating system and Novell has built symmetric multiprocessing support into the product.

"With all the bells and whistles they have included in the box for free, they have really made the product interesting to us die-hard 3.X users," said Klucko, who recently hosted a 3.X to 4.X migration seminar for members of his local NetWare user's group to demonstrate the benefits of Novell's latest release.

In the past, customers clung to NetWare 3.X for its stability. Deterrents to migrating from it included hassles with moving 3.X bindery information to the Novell Directory Service (NDS) and the learning curve involved with managing the new directory.

Doug Freeby, a systems analyst at ABB Environmental Services, Inc. in Portland, Maine, said his company is halfway through migrating its 14 3.X servers to NetWare 4.X.

"We want the obvious advantage of having NDS everywhere, but we are only migrating at a pace that our budget and man-hours permit," he said. "Fortunately for us, 3.X is stable

enough to allow us to stay with it until we can afford to move."

Novell's present installed base comprises twice as many NetWare 3.X customers as 4.X ones. But Samm DiStasio, product marketing manager for IntranetWare, said sales of NetWare 4.X products now make up 70% of the company's network operating system sales.



Goldco's Klucko is planning a NetWare 3.X to 4.11 migration.

"We've eliminated a lot of the barriers to [NetWare 4.X] adoption," DiStasio said. "We've included graphical wizards for step-by-step 3.X migration and tools to help you manage NDS.

And since 4.X has been out there in use for three years now, its stability has become tried-and-true."

One reseller who has not sold a single copy of NetWare 3.X in the past six months predicted that most NetWare 3.X users will

What does your NOS cost you?

Interpose, Inc.'s Client/Server 2.0 application lets users measure network operating system (NOS) cost of ownership. Here's the expected per-server cost of ownership for networks running five departmental servers with 50 Windows clients each:

NOS	Year 1	Year 2	Year 3
NetWare 3.X	\$373,431	\$435,045	\$548,217
NetWare 4.X	\$324,787	\$386,929	\$470,507
Windows NT 4.X	\$350,889	\$412,269	\$501,393

SOURCE: INTERPOSE, ALTAMONTE SPRINGS, FLA.

migrate to either NetWare 4.X or Microsoft Corp.'s Windows NT by the middle of next year.

"NetWare 3.X has pretty much been running out of steam. New application support

is diminishing, and its technical limits have been stretched beyond anything that Novell had designed it to handle," said Dennis Cheek, senior network consultant at Networks, Inc. in Delray Beach, Fla.

Moreover, according to DiStasio any company looking to

deploy a corporate intranet would find it costs less to upgrade to IntranetWare than to buy the necessary components to set up an intranet on a NetWare 3.X net. ■

Compaq soups up ProLiant server line

By John Robinson
Houston

Compaq Computer Corp. today will announce the latest addition to its ProLiant family, a Pentium Pro departmental server that runs on up to two 200-MHz processors.

The ProLiant 2500, positioned to replace the company's popular 1500 model, comes standard with one processor, 32M bytes of ECC memory, an integrated 10M/100M bit/sec Ethernet network interface card and Wide-Ultra SCSI.

With four PCI slots and two PCI/EISA shared slots, external storage can be expanded to 270G bytes and memory beefed up to 1G byte. The company expects the server to be adopted for departmental Internet/intranet duties, as well as traditional file and print services.

Compaq paid more attention to the outside of the box than in previous ProLiant configurations so that the server is easier to service and upgrade, said John Young, director of product marketing at Compaq. A removable top panel allows administrators to add PCI and EISA expansion

boards, and a board pulls out for memory or processor upgrades.

A removable side panel is configured for the addition of a redundant power supply or additional media devices. A protective door covers removable media bays, and a key lock secures all panels and components. The 2500 also includes a conversion kit for configuring the server in a rack formation.

Compaq's Integrated Remote Console, which works with software to monitor the server, comes packaged with the 2500, enabling remote monitoring, control and reboot.

In the first half of next year, the server will be configured with an optional key pad and LCD display that will let administrators monitor and service server functions. Lynda Fitzpatrick, an analyst at International Data Corp. in Framingham, Mass., said the 2500 should fit

well in the ProLiant family with its Pentium Pro performance.

"Compaq has always tried to really [improve] the ease-of-use capabilities of their servers, and the 2500 is another example of that," Fitzpatrick said. "In addition, the integrated IRC will appeal to remote offices looking for improved manageability." The 2500 supports NetWare, SCO Unix, UnixWare, Windows NT, OS/2 and Banyan VINES operating systems.



The ProLiant 2500, with a new chassis design, was developed for easy manageability and serviceability.

Compaq today also announced the 6/200 FlexSMP Dual Processor Board for the 1500, which brings the server up to 2500 snuff with room for two processors and 512M bytes of memory.

A ProLiant 2500 with one processor, 32M bytes of RAM and a 4.3G-byte hard drive is priced at \$7,232. Pricing was not available for the 6/200 board.

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XLNT walks FDDI down the Gigabit Ethernet path

Company moves beyond stand-alone Ethernet and FDDI switches with Velocity chassis, set for May release.

By John Robinson
San Diego

XLNT Designs, Inc. is prepping a switching chassis for migrating FDDI customers to Gigabit Ethernet, getting its ducks in line for the emerging technology.

The chassis, code-named Velocity and slated for release in May, will include four I/O slots for FDDI, Ethernet, Fast Ethernet and Gigabit Ethernet. It will later support ATM and token-ring cards.

Customers will be able to configure the four-slot chassis with a mix of up to four Gigabit Ethernet ports, 32 10M/100M bit/sec Ethernet ports and eight ports for FDDI connections.

The chassis boasts a back-plane capacity of 3.2G to 6.4G bit/sec.

The switch will feature redundant power supplies and hot-swappable modules, as well as FDDI's standard dual-homing features for Gigabit Ethernet, ensuring high availability. It will also include hooks for Layer 3 switching.

"If we are going to play, then we have to provide a variety of [technologies] for users to choose from," said Bill Atkinson, president and chief executive officer of XLNT. "[Velocity] gives us a box that is multiprotocol, multislot — it will handle anything."

type of performance because it needs to chop up packets before transmitting them.

Velocity will be priced at less than

\$6,500 per FDDI port, \$750 per 10M/100M bit/sec Ethernet port and \$3,750 per Gigabit Ethernet port.

In related news, the company last week

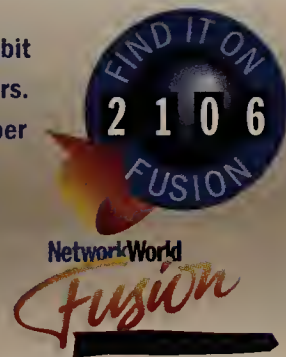
announced the formation of the Gigabit Ethernet Educational Council, a company-led vendor and user group that will study migration technologies for Gigabit Ethernet and report findings to the Gigabit Ethernet Alliance.

The alliance has not recognized the new group.

©XLNT: (619) 487-9320.

XLNT emphasized that its primary goal with Velocity is to provide a path for FDDI users that are not ready to rip out their installed base but want to move to Gigabit Ethernet.

Download Gigabit Ethernet primers. Enter the number to the right in the DocFinder box on the home page.



Currently, XLNT offers the Quick-Stack family of Ethernet and FDDI stand-alone and stackable switches.

XLNT emphasized that its primary goal with Velocity is to provide a path for FDDI users that are not ready to rip out their installed base but want to move to Gigabit Ethernet.

The company cited a recent Dataquest, Inc. report that claims the Gigabit Ethernet market will grow from \$73 million in 1997 to \$2.9 billion in 1999.

Atkinson predicted users will choose Gigabit Ethernet once standards are finalized and adopted. According to Atkinson, ATM will not be able to deliver the same

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COLIN WHITE
President, DataBase Associates; DB/EXPO Conference Director
Tuesday, Dec. 3, 9:30 am

CHARLES B. WANG
Chairman & Chief Executive Officer, Computer Associates
Tuesday, Dec. 3, 9:50 am

EDWARD J. ZANDER
President, Sun Microsystems Computer Company & Corporate Executive Officer, Sun Microsystems, Inc.
Tuesday, Dec. 3, 12:45 pm

THE GREAT DEBATE Weds, Dec. 4, 12:30 pm
PHILIP A. BERNSTEIN, Microsoft Corporation
HERB EDELSTEIN, Chairperson, Two Crows Corp.
ROBERT EPSTEIN, Sybase, Inc.
DON HADERLE, IBM Corporation
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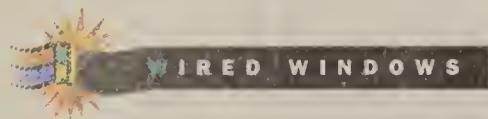
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No one gets fired for buying Microsoft

A few years ago, it was said, "No one ever got fired for buying IBM." The implication was that IBM products, although more expensive, worked well enough and had so many intangibles such as service and support behind them that

they amounted to a safe choice for the hardware or software buyer.

Today, you can replace IBM in that saying with Microsoft. Look through the buyer's guides in this or any other trade magazine, read the reviews of software products, and you're left with the distinct impression that, based on performance or feature set, Microsoft's products almost

always rank in the top five but rarely command the No. 1 position.

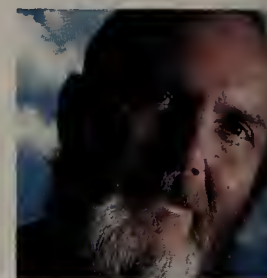
Most independent consultants, writers and pundits chant the mantra, "First pick the application, then decide on operating system and platform." If you followed this logic, then Microsoft would simply be a bit player in the applications market. Yet this is far from the truth.

In looking at why this is so, we're left with the inescapable conclusion that buying Microsoft is somehow safe. You simply assume the Microsoft application will coexist with other Microsoft applications and operating systems better than non-Microsoft applications. When they don't, we believe that Microsoft will issue patches and updates to correct the situation.

We also believe that Microsoft and the application will be around for some time, always updating and improving.

Well, maybe "we" don't believe that. After all, we're familiar with the developers who bought into Microsoft's Blackbird technology, and with the problems installing and running Microsoft Office on NT 4.0.

But our bosses believe these things, or maybe it's their bosses who believes them.



Dave Kearns

Either way, you have got some new ammunition from someone that your boss (or his boss) would listen to and, in fact, may have listened to recently at the Gartner Group's CIO conference.

"People should just buy the best product," he said, to much applause. After all, this was Microsoft CEO Bill Gates speaking, and he ought to know.

So arm yourself with this quote, the latest *Network World* Buyer's Guide and the specifications for the application you really want to buy, and write up that purchase order.

At least, according to Bill, you shouldn't risk getting fired if you just buy the best.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

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September	9	Philippines
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September	18	Hong Kong



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Tip of the week

Link Check is a powerful suite of diagnostic programs for Windows 95 that lets you examine an executable program's related files, modules and function calls. The primary component mimics a program's execution, and any missing files required by that program are highlighted. A Memory Check component lets you view, load and unload modules residing in memory. This \$35 shareware program offers an efficient way to scan executable programs, test supporting files, and clean up your Windows 95 installation. It is available via the Web (www.shareware.com/).

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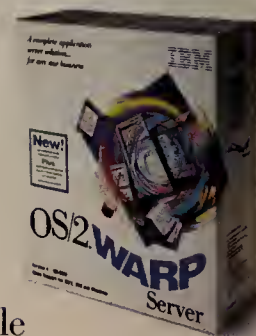
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INRA-Net

Safe and sound?

If you think so,
it's time to think again.

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Also inside

- The legacy tango
- Teaching spiders to spy
- Review: O'Reilly's WebSite

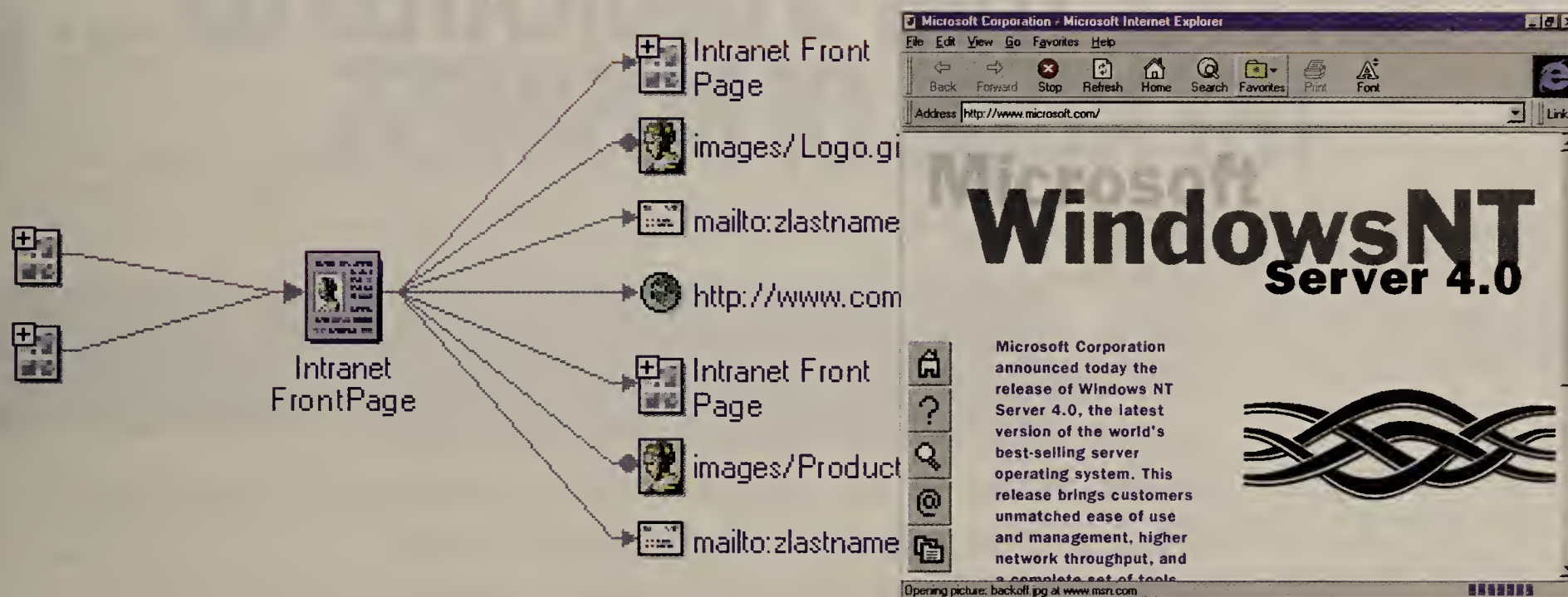
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IntraNet

October 1996
Volume 1, Number 5

FEATURES •

21 Creepy, crawly commandos

What can you do to provide some structure to that chaotic mess of information you call an intranet? Set a spider loose to tidy it up.



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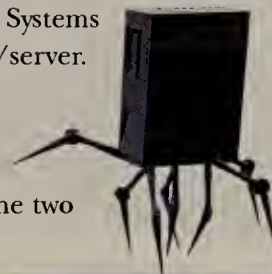
So your customers want to know the status of their accounts and outstanding orders? Place the information they want a mouse click away by letting them into your intranet.

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If mainframes are stodgy, dyed-in-the-wool and typically pinstriped, intranet are chatty, irrepressible and eager to get things done. But sooner or later the two will have to tango.



46 COVER: Safe and sound?

Every time you get feeling pretty good about security, bells should go off in your head. This isn't something you can do once and relax. Constant vigilance is the order of the day. Cover illustration by Joel Nakamura.



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With widespread vendor backing, the Lightweight Directory Access Protocol promises to make corporate directory lookups quick and easy.

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As an intranet solution for mid-scale loads, this Web server is a safe bet. It's a solid

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From the client to the server, for the administrator, application developer, designer or user, the word in intranet product circles these days is "suite."



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Be intranet cool: Give employees visually compelling reasons to use the corporate Web and have a security policy that keeps it private, secure and effective, advises Mark Gibbs in his monthly column.

From the Editor

Client/server is dead. Long live client/server (in Web dressing)!

That was the resounding chorus at the recent Internet Commerce Expo (ICE) in Anaheim and at Interop DotCom in Atlanta. If you're deploying client/server applications today, stop. Retool them with browser front ends.

Client/server was killed by complexity, said Dean Marino, a research associate in Dow Chemical Co.'s computing and information technology laboratory. Every back-end application requires a different client and often a middleware component. The architecture is costly, bloated and difficult to manage.

Compare that to the simplicity of using browsers to access back-end applications. As Netscape CEO Jim Barksdale pointed out at ICE, with client/server, we overlooked the need for the client to act like a phone. "You want to be able to use one instrument to call your doctor, your broker, your dentist."

Problems remain with the universal client vision. For example, the stateless nature of the Web (every link invokes a new connection) wreaks havoc with things like security and data concurrency. But there are a few early workarounds, and developers are hard at work on these issues.

In fact, that's the point. The allure of intranets is so great that companies are committing lots of development money to the cause. Dow, for example, is already using its Web servers to support mathematical modeling.

It's only going to get better with time.

John Dix, Editor (jdix@nww.com)

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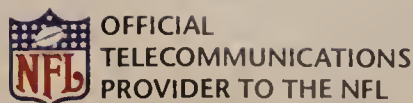
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Animation agreement

Web sites are getting noisy and animated thanks to some recent vendor agreements on multimedia delivery standards.

Cisco Systems, Inc. (cisco.com), Intel Corp. (intel.com) and MCI Communications Corp. (mci.com) recently agreed on IP Multicast, Resource Reservation Protocol (RSVP) and real-time transport protocol (RTP) for bandwidth issues, and launched some joint trials. This cooperation could boost development of real-time audio and video streams.

"This is the multimedia-enabling technology corporate

users have been waiting for," says Kathy Klotz, an analyst with Dataquest, Inc.. She calls RSVP "an important move toward enabling better quality video communications" because it dedicates certain bandwidth to audio

and video transmissions. RTP and IP Multicast also help allocate the pipe. Klotz expects first products as soon as next month.

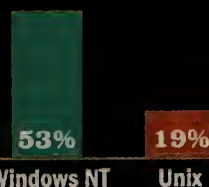
Also on the multimedia front, Apple Computer, Inc. (apple.com) announced it will implement its popular QuickTime application program interface feature set on Microsoft Corp. Windows 95 and Windows NT, with some help from Data Translation Corp., Macromedia, Inc. and Truevision, Inc.

MESSAGING METRONOME

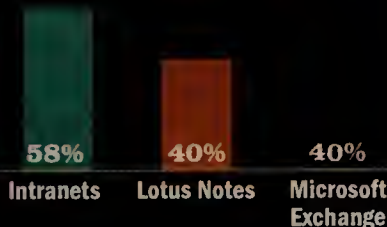
FUTURE MESSAGING BACKBONES



FUTURE SERVER PLATFORMS



FUTURE COLLABORATION PLATFORMS



Intranet messaging

Intranet/internet-based messaging systems are rapidly driving out LAN-based E-mail, according to a survey of Fortune 1,000 firms by The Radicati Group, Inc., in Palo Alto, Calif.

Organizations are switching to standard messaging systems, notably Multi-purpose Internet Mail Extension, Simple Mail Transfer Protocol and X.400. Twenty-one percent say they're already deploying backbones that combine MIME, SMTP and X.400.

NT is edging out Unix as a future server platform, but mixed-vendor environments appear to be the norm for intranets. Companies say their workgroup environments will include a combination of internal Web technology, Notes and Exchange.

Respondents were allowed multiple answers.



NAME	COMPANY	AWARD CATEGORY	PRODUCT/SERVICE
(Front left to right)			
David Averett	NetFRAME	Web Server Hardware	NetFRAME Server
Dennis Cagan	Software.com	Intranet Infrastructure	Post Office
Gil Schwed	CheckPoint Software	Security Products	FireWall-1
Steve Zocchi	NetDynamics	Authoring & Development	NetDynamics
J. P. Stanley	FTP Software	Collaboration Tools	GroupWorks
John Guerster	Open Market	Electronic Commerce Tools	OM-Transact
(Back left to right)			
Rick Fleischman	Netscape	Web Server Software	Navigator
Vishal Nanda	Netscape	Web browser	Enterprise Server
Allan Taffel	UUNET	Internet Access Provider	UUNET Internet Access
Bob Kutnick	Quarterdeck	Search & Retrieval Tech.	WebCompass

Winning lineup

We're pleased to announce the winners of the first annual Intranet Excellence Awards, which honored 10 companies for product innovation and leadership. The winners, picked by a panel of judges, were presented awards at NetWorld+Interop conference in Atlanta.

The judging panel included James Broyer, managing partner of Accel Partners; Jeffrey Held, a partner with Ernst & Young's Technology Services practice;

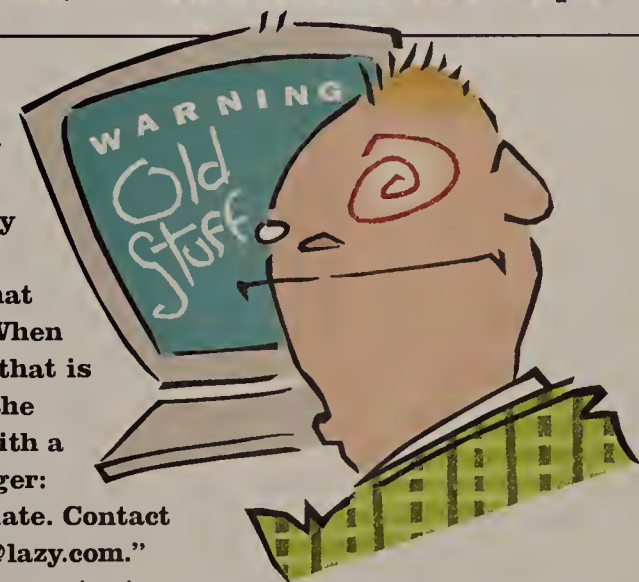
Neil Weintraut, advisory director of the Internet at Hambrecht & Quist; Richard Villars, director of network software research at International Data Corp.; Mimi Brooks, president and CEO of Logical Design Solutions; Edwin Mier, president of Mier Communications; Michael Goulde, vice president and senior consultant, Patricia Seybold Group; Kevin Tolly, president of The Tolly Group; and Patricia O'Hern, senior consultant with Utopia.

Can't get no respect?

Having trouble getting content owners to keep documents up to date? Try this trick:

Create a Java applet that watches a date counter. When users access a document that is more than 120 days old, the applet opens a window with a message that says, "Danger: This data may be out of date. Contact Imin Trouble at itrouble@lazy.com."

"It doesn't take long for content owners to realize that keeping the Web documents up to date is less laborious than answering all that E-mail," says the intranet evangelist who cooked up the idea.



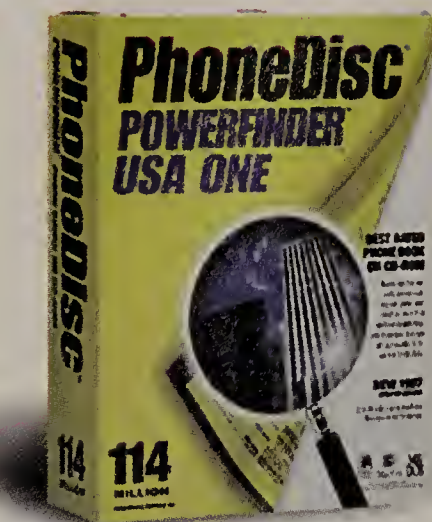
hot links

Find that contact

Tired of wasting time dialing 555-1212 in search of phone numbers? Put up a national directory of business and residential listings on your intranet and open it to browser users.

Digital Directory Assistance, Inc.'s PowerFinder USA One database of 115 million listings, used with the company's PhoneDisc Intranet Server for Windows 95 or Windows NT, makes it possible to search for listings by name, type of business, address or phone number. The database takes up six slots on an optical disk jukebox or 4G bytes of hard disk space.

Longitude and latitude coordinates are provided on request,



and distance searches can be run, providing, for example, all the pizza shops within three miles.

The USA One database costs \$259 and the server software costs \$99. Additional charges apply, based on the number of users supported. Contact DDA at www.dda-inc.com.

E-mail vs. intranets: a cost comparison

Finding hard and fast numbers to help justify an intranet project can be a challenge, but one Silicon Valley firm found this way to rationalize a project.

The company was distributing a 750K-byte master supplier list as an E-mail attachment to all company employees around the world once per quarter. An intranet convert went to MIS and asked it to calculate the cost of sending that attachment. MIS came back with the following estimates:

- Transmission cost through the company WAN to almost 200 locations worldwide: \$500
- Storage of the document on mail servers in all locations for a period ranging from 1 minute (immediately read) to one month (employee on the road), assuming 10% of the employees actually needed the listing and saved it to local disk: \$3,250
- Total cost: \$3,750 per each 750K-byte E-mail.

A Web solution was proposed

to the content owner as an alternative, and has since been adopted. Here are the cost estimates:

- Transmission cost of a 2K-byte E-mail note to all employees that says, "If you're interested in the latest copy of the master supplier list, go to this URL: <\$10
- Since people who are not interested in the list immediately delete the message, and since there is nothing to save, storage costs have been reduced to less than \$35. (This figure takes into account the cost of caching the data at eight proxy servers used as local distribution points to reduce transmission costs.)
- Total cost: <\$45

The savings per quarter added up to roughly \$3,700, or \$14,800 per year. A further benefit: The content is never out of date. With thousands of suppliers, the list changed daily but was only being updated every 12 to 13 weeks.

Microsoft animates HTML editor

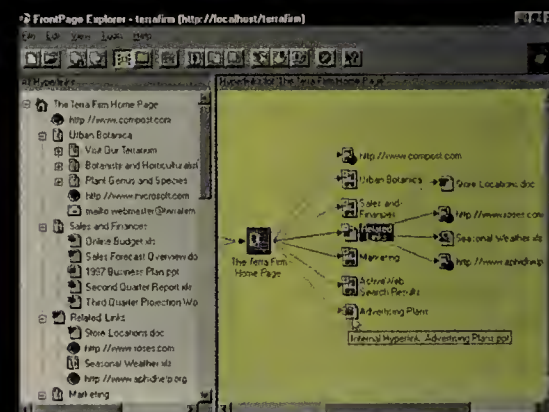
Microsoft Corp. FrontPage 97 Web design tool can be downloaded from Microsoft's Web site (microsoft.com) this month, but you need to shell out \$10 for the CD-ROM version if you want all the extras crammed into this release.

Noteworthy is the Image Composer, a high-end image editing program bundled in the FrontPage 97 Bonus Pack of templates, art and assorted accessories. Its chief innovation is the use of "sprites," or images defined precisely by their shapes. Users can move, resize and manipulate images directly, without retaining a cut-out border around them.

FrontPage 97 offers a peek at the upcoming Office 97; FrontPage shares code with that family, says George Meng, group product manager for FrontPage. Users can build hyperlinks among documents created under any Office application, including Access, Excel, PowerPoint and especially Word. FrontPage 97 integrates tightly with the word proces-

sor; it accepts the 25 most common shortcuts found in Word and uses Word's dictionary.

FrontPage 97, which only runs on Windows 95, also implements ActiveX controls and handles Java applets and new HTML tags (like mar-



FrontPage 97 integrates the Explorer browser so developers can pair it with other features like this Web site map.

queues) and other multimedia features. The update also supports Netscape plug-ins.

The company even throws in copies of Internet Explorer 3.0 and Microsoft Personal Web Server, which is the same product bundled with Windows NT workstation.

Microsoft expects to ship FrontPage 97 by year-end; the current version is priced at \$149 as is.

New network computers swallow software

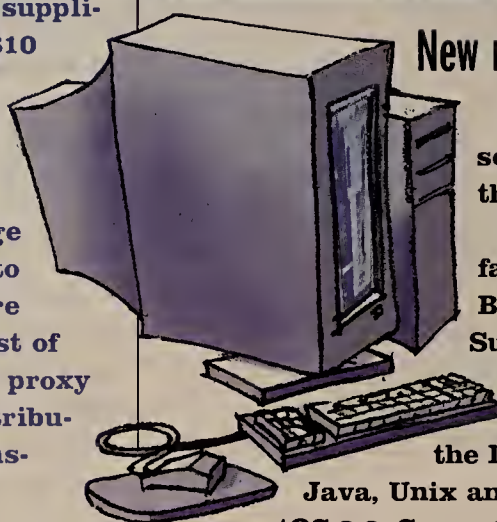
Network computers (NC) are entering their second generation, even as pundits debate their worth.

A couple of these thin clients will ship this fall. HDS Network Systems, Inc. (hds.com) and Boundless Technologies, Inc. (formerly SunRiver Data Systems) offer entry NCs for less than \$700 with some basic software. The new HDS WorkStation Supra-66 is based on the Intel Corp. 66-MHz RISC processor. It runs

Java, Unix and Windows, plus the HDS operating system, netOS 2.0. Supra-66 models start at \$1,299 for a system with 8M bytes of RAM, but the sibling 40-MHz Supra-40 line starts at \$699.

The new entries from Boundless Technologies (boundless.com) make up the Boundless NC line, ranging from 25-MHz to 33-MHz Intel i960 systems. All include Windows, a local Java browser and 3270 terminal access software. Options include audio and telephony functions. Pricing for the Boundless line starts at \$649.

The companies tout lower cost of ownership and easy hookup to IP networks to lure corporate interest.





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LDAP: Making corporate directory lookups quick and easy

BY MARK GIBBS

Have you ever had a conversation with a Web newbie trying to find the name of a particular department's intranet server? Then you know what a headache can result. Of course, if you don't need to be diplomatic, you can simply say, "That's the way it is buddy, now get out of my hair." The more polite might end up explaining the intricacies of Internet-style naming and the limitations of directory services.

The problem of naming things on networks has been with us for a long time, and the most common solution has been the Internet's Domain Name Service (DNS). Over the years, DNS has served the Internet community well, but commercial implementations require a more flexible and richly featured directory service.

The solution to the above support problem and the successor to DNS may well be the Lightweight Directory Access Protocol (LDAP), which derives from an ISO X.500 standard called Directory Access Protocol and is now managed by the Internet Engineering Task Force.

There's gold in this protocol. LDAP's powerful architecture has attracted the likes of IBM, Microsoft Corp., Netscape Communications Corp., Novell, Inc. and dozens of other industry players. More than 40 vendors have publicly committed to supporting LDAP, and if its implementation and adoption proceeds as it appears it might, a whole new directory system for the Internet and intranets may soon appear.

The end result, which will materialize perhaps

as early as the first half of 1997, should be a directory service that is effective and as simple to use as A, B, C.

Communications access protocol

A directory generally provides the ability to retrieve the values of one or more attributes of an entity defined in the directory. With DNS, for example, the request to resolve the entry `www.gibbs.com` would return `199.201.128.15`. This name-to-numeric address translation is arguably one of the most important underpinnings of the Internet. However, DNS doesn't provide much additional functionality. To keep up with the Internet and intranets, much richer directory services are needed.

To make your intranet user-friendly, for example, you need white pages so users can easily look up E-mail addresses. A user should be able to run a search for "Mark Gibbs" and find out his E-mail address is `mgibbs@gibbs.com`. You also need certificate servers so people can find public encryption keys; yellow pages so they can locate other people, organizations and resources by type or function; and a whole raft of other services that will provide an infrastructure that really supports commercial use.

All this access to directory services requires a communications protocol. Enter LDAP, an access protocol that operates over TCP/IP and provides access to either proprietary stand-alone directories or X.500-compliant systems. LDAP is defined in the IETF's RFC 1777.

Hierarchical approach

The directory model underlying LDAP is based on client/server access to entries, or records in the directory database. An entry contains a relative distinguished name (RDN) and a collection of attributes.

Entries in an LDAP directory are arranged into an inverted hierarchical tree, much the same as for X.500. With LDAP, the hierarchy rules of X.500 and the available attributes types are not required, though for compatibility's sake, it is probable that most directories will use X.500 conventions.

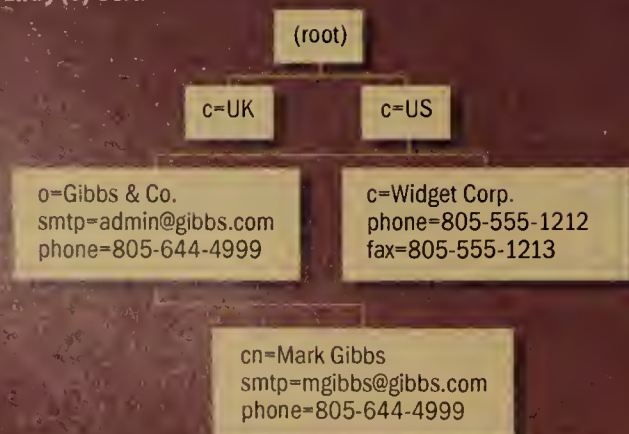
An entry's distinguished name (DN) is the concatenation of all of the RDNs of each entry that leads from the entity to the root of the hierarchy. The hierarchical tree pictured at left shows that the entry for "Mark Gibbs" with the RDN of "cn=Mark Gibbs" has a DN of "cn=Mark Gibbs, o=Gibbs & Co. and c=US." The attributes of each entry are typed: cn, o and c, which stand for common name, organization and country, respectively. In the example, each has an assigned value.

With X.500, complete DNs are required to define an entry. As a

See Handbook, page 12

DISTINGUISHED APPROACH

LDAP directory entries are arranged into an inverted hierarchical tree. This tree shows that the entrant's common name (cn) is Mark Gibbs, from the organization (o) Gibbs & Co., which is located in the country (c) USA.



ASK DR. INTRANET

David Morro is in for consultations. He'll help diagnose your intranet ailments or recommend corrective steps. Send your questions to dr.intranet@nww.com.

Is it possible to create personalized Web pages?

Allowing your CEO to customize his start-up page to include the company's stock price rather than the inventory of pencils can help keep the intranet user-friendly. Rather than get lost in a sea of worthless information, users can configure their start-up pages to include links to only frequently accessed pages and functions.

The most common implementation of personalized start pages uses an HTTP technology called cookies. Cookies refer to name/value pairs a Web browser uses to store user information, including start-page preferences. Netscape Communications Corp., for one, is trying to make it easy to create these pages (see http://home.netscape.com/news-ref/std/cookie_spec.html).

As part of its recently introduced AppFoundry program, Netscape has developed a template for adding customizable start pages to your intranet. This application uses JavaScript to issue the appropriate cookie to the client, but the functionality can be added through custom Common Gateway Interface scripts, as well.

It seems a number of vendors are offering intranet product suites. Do you think it's wise to buy into such a suite or is it better to mix and match vendors' products?

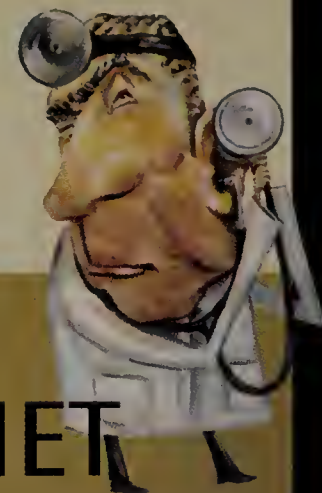
Software companies combine their software products into packages, or suites, for two reasons: one, to provide a complete and integrated solution, and two, to sell more software. To make sure you're not getting soaked with software you don't need, approach your product evaluations with a clear definition of your intranet's role and an understanding of each vendor's strategic aims.

Netscape, for instance, offers a collection of servers in a suite called SuiteSpot. And through its recently introduced AppFoundry program, Netscape intends to continuously develop intranet applications that extend the use of those servers.

Microsoft, on the other hand, has integrated its Web server into Windows NT and will partner the server with a new generation of Web-enabled desktop applications that will let users interact with the corporate intranet using already-familiar tools.

By all means, if the suite fits, buy it. Standardizing on a single company's products will greatly simplify installation, integration, training and maintenance of your intranet.

Morro is a Web architect at Interse Corp., a Sunnyvale, Calif.-based Web development firm.



The inverted-tree directory model underlying LDAP is based on client/server access to entries, or records in a directory database.

LDAP's powerful architecture has attracted the likes of IBM, Microsoft, Netscape, Novell and dozens of other industry companies.

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Handbook, continued from page 10
result, many X.400 E-mail users have long, complex DN's on their business cards. LDAP, by completely hiding DN's, makes the service far more accessible to the average user. Instead of needing to know a long, complex DN, LDAP makes it possible to simply look up someone by the name and company listed on his or her business card.

The heart of LDAP are the operations defined for searching and modifying the directory. In fact, searching is estimated to exceed other LDAP operations by at least an order of magnitude in real-world systems.

LDAP can be configured as a distributed directory system so that two or more LDAP servers can manage separate parts of a directory tree. The servers

don't have to keep complete trees, so if an LDAP client makes a request that a server can't resolve, that server can refer the client to another server.

To maintain integrity, LDAP provides a way for a client to prove its identity to a directory server. Kerberos, an authentication system that lets two communicating computers prove their identity to each other while preventing eaves-

dropping or other attacks, is most commonly used.

Access Control Lists control which classes of clients can access which classes of information at which level — none, compare, search, read, write, delete. LDAP directory servers can log all additions and modifications to provide an audit trail of changes.

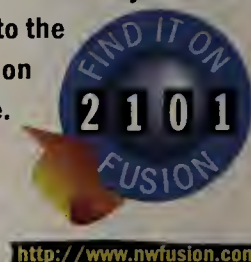
Vendor positioning

The use of LDAP systems in intranets and on the Internet will not displace DNS, but rather work in conjunction with it. Netscape, in a positioning paper called "An Internet Approach to Directories" discusses some scenarios of how this might work. Particularly interesting is a proposed URL definition to support LDAP searches.

The degree of LDAP support is an encouraging sign that effective directory

LDAP ON THE WEB

Get more information on LDAP on Network World Fusion. Key the number at right into the DocFinder box on the home page.



service may be somewhat nearer to reality than one might think. Certainly a race to be first with a practical system seems to be brewing.

Netscape, in the paper mentioned above, has the best-articulated position. Microsoft, despite its pledge of support, really seems more interested in pushing the market toward its Open Directory Services Interface (ODSI) as an interoperability layer to interface with all directory services.

In response to the market in general and to Microsoft's ODSI positioning in particular, Novell proposes that its Novell Directory Services becomes X.500-compliant and forms a superset API to everything, including ODSI.

Until these vendors solidify their plans, it is difficult to say who will determine the market direction. Watch for the major battle to be between Microsoft and Netscape.

What does LDAP and its nascent market imply for intranets? The answer is simple: Because naming won't be constrained by the artificial constructs used in systems such as the dominant DNS, users will be able to look for and find resources much more easily. And, once LDAP is integrated with network management tools, you'll be able to better organize the resources on your intranet.

Unless the LDAP supporters start arguing and delay development and deployment, LDAP is going to become a major service in the Internet and intranet markets. ☺

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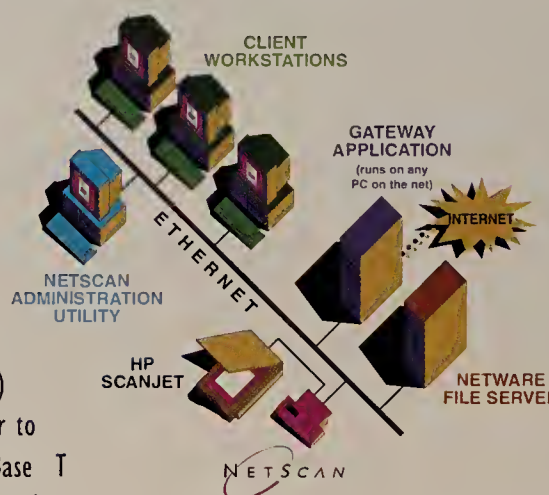
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Circle Reader Service #1



REVIEW

O'Reilly's WebSite Pro 1.1: Building a better mousetrap

BY MARK GIBBS

The Web server marketplace has exploded over the last year. We've gone from having only a half a dozen freeware systems to more than 100 freeware and commercial products to choose among. And each one, of course, bills itself as the better mousetrap.

So it's now rather difficult to choose a Web server. The actual engine, meaning the HTTP server, isn't tremendously complex or different product to product. What differentiates one Web server from another is the stuff that vendors add: the management tools, diagnostic capabilities and documentation, which is a crucial but often lacking element.

In the computer marketplace, it's unusual to find good documentation, even in top-end products. It's extremely rare to find excellent documentation and a sophisticated product. O'Reilly & Associates, Inc.'s WebSite Professional stands out on both counts.

O'Reilly, a Sebastopol, Calif., publisher known for its high-quality technical books, entered the Web server market about a year ago with WebSite, a Windows NT- and Windows 95-based HTTP server.

While an excellent server with good documentation, WebSite's market potential diminished when Microsoft Corp.

entered the Internet product arena last December. O'Reilly realized that in the face of Microsoft's free Internet Information Server, WebSite wasn't going to provide the revenue stream it had hoped. In response, it made WebSite available through what is effectively a free commercial release.

But O'Reilly didn't stop there. It upped the ante, so to speak, by launching a much more sophisticated package, WebSite Professional. The move speaks volumes for the company's competitive instincts; taking on Microsoft and Netscape Communications Corp. is not for the faint-hearted.

A professional job

WebSite Pro is a solid performer in terms of throughput, has comprehensive security services and offers not only a tremendous range of utilities and tools but also outstanding documentation. As an intranet (or even Internet) Web solution for mid-scale loads (up to about 300,000 to 500,000 hits per day), the well-designed WebSite Pro is a good value. It boasts one of the best

set of management tools and interfaces I've seen.

I tested WebSite Pro running as a service under Windows NT Server Version 4.0 on a 100-MHz Pentium processor with 16M bytes of RAM in a Chatcom, Inc. NT10 server. Generally, you would want to run with 32M bytes of RAM to ensure adequate memory for back-end applications, but WebSite Pro ran on the smaller platform without any problems. (It's interesting to note that many of the Web servers I've tested to date won't even run properly in 16M bytes of RAM.)

WebSite Pro takes no more than half an hour to install from CD-ROM under Windows NT or Win95. Under Windows NT, the Web server can be configured as either a service or an application. Basic configuration parameters, such as server name and directory locations, are done at installation.

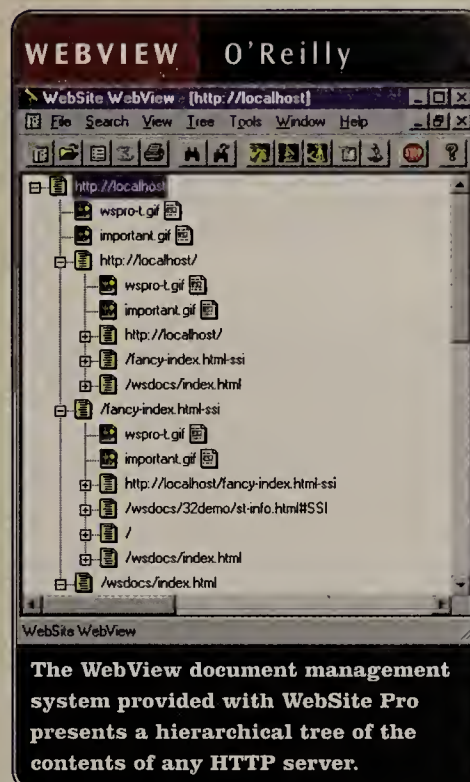
The server comes with Getting Started, WebSite Pro Basics and WebSite Pro Advanced Topics manuals.

This has got to be some of the best documentation I've ever seen. It's well-written, clear and extensive. In particular, the manuals effectively walk you through complex topics such as Web server access controls, obtaining and installing server authentication certificates and writing back-end scripts.

Many Web servers are deficient in their management interfaces, but not WebSite Pro. WebSite actually has two such interfaces: one for the management of the server proper and the other, called WebView, for managing the server's data.

Server management is accomplished through a Windows-style tabbed properties box that can be accessed from the start-up bar. Management functions are grouped into logical sections with excellent context-sensitive help.

O'Reilly also has incorporated a number of wizards, more formally known as automated configuration dialogs, into the management sys-



The WebView document management system provided with WebSite Pro presents a hierarchical tree of the contents of any HTTP server.

tem. With the wizards, setting up virtual servers (multiple domain names and TCP/IP addresses) is easy.

Support for virtual servers is particularly useful in intranet environments. The ability to define unique Web server identities for different departments and workgroups makes it easy to move those groups to new servers when bandwidth or security requirements change.

One of WebSite Pro's strengths is the WebView document management system. WebView presents a hierarchical tree of the contents of any HTTP server — although if the server isn't WebSite Pro, you won't be able to do much beyond browse the documents in the tree.

A Web with a view

You can view your Web documents in several ways: by file name, partial or full URL, the link label (from the HREF or ALT attributes in HTML documents), or document title. This makes it easy to understand the relationship among documents.

Icons show each document's type — such as HTML, image and video — and status. The status icons show at a glance which pages are virtual documents created by back-end scripts and which are external references. You also can tell from the status icons if external and internal links are broken.

WebView has a useful Find feature that lets you filter which documents are displayed. Many Web administrators will find it worthwhile to use the filter to show broken links.

You can modify existing documents with any editor. However, if there's a previous association setup with HTML documents, then WebView considers that association the default.

In addition, WebSite Pro supports an HTTP extension (the Put command) that allows documents to be uploaded to the server. This makes

See Review, page 18

PROS AND CONS O'Reilly's WebSite Professional

Pros

- Provides a complete Web solution
- Offers good management tools
- Comes bundled with database access capabilities and an HTML editor and browser
- Has excellent documentation

Cons

- Has weak remote management capabilities
- Does not integrate with existing user Windows databases

SUMMARY: O'Reilly's WebSite Professional is an outstanding Web server that can provide a sound and effective base for an intranet.

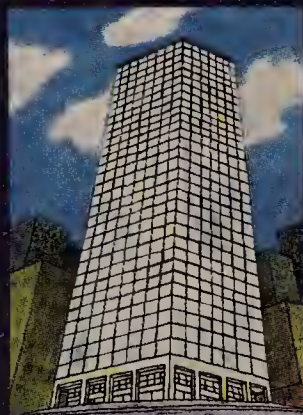
RATING

Value for money	4
Intranet usefulness	5
Quality	5
Overall	5

1 is poor and 5 is excellent



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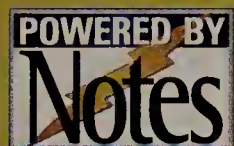
Yet its benefits don't stop there. Domino

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Review, continued from page 15

WebSite Pro compatible with editors such as Netscape's Navigator Gold.

To complete the editing facilities, WebSite Pro comes bundled with the HotDog HTML editor from Sausage Software and the Mosaic browser from Spyglass, Inc.

WebView also provides wizards for creating a search page for finding documents using the bundled WebFind search engine, a home page, an Under Construction page and a What's New page. These generic page layouts are inserted into your Web with your specific data embedded. You need to edit the pages to fine-tune their content and appearance. This is a weak component of the product, as there are only four wizards and they really don't add much to your Web management.

When it comes to security, WebSite Pro is particularly well-featured. It supports the usual Web access controls such as user, group and realm (collections of users and groups), as well as IP address and host name (domain name) filtering.

In addition, WebSite Pro supports Secure Sockets Layer Version 2.0 and Secure-HTTP, both of which allow encrypted communications between servers and clients. Optionally, it supports authentication through digital certificates.

As if all of the above weren't enough, O'Reilly has gone flat out to add features that round out the WebSite Pro server.

The extensive documentation for building

back-end applications covers the WebSite API, O'Reilly's equivalent to Microsoft's Internet Server API and Netscape's Netscape Server API. These APIs provide an environment under which applications can run as re-entrant shared Dynamic Link Libraries to improve performance and add value to Web server programming.

WebSite Pro also comes with an imagemap editor for creating images that link to multiple URLs depending on where in the image you click; Allaire Corp.'s Cold Fusion Standard Edition, which lets you link Open Database Connectivity-compliant databases to your Web system; WebIndex, which builds search indexes for your server; and WebFind, which provides the user interface through the WebSite Pro server to the indexes built by WebIndex.

Problem areas

WebSite Pro stores all of its configuration settings in the Windows Registry, a process that leads to one of the product's drawbacks: weak



remote management. To set this up, you need to configure access to the registry, which can be tedious.

Also on the downside, the WebSite Pro server does not provide integration with the users and groups configured in the Windows system. The lack of integration means that you'll have to re-enter the details of already defined local and network users if you wish to control their access to the Web services.

Setting your sites

Razor blade king Charles Gillette is quoted as saying: "[Ralph Waldo] Emerson said if you build a better mousetrap, the world will

beat a path to your door, and that may have been true then... but it's not true now. No one will come. You have to package and promote that mousetrap. Then they will come."

With its WebSite Pro server, O'Reilly has one the best mousetraps, I mean Web servers, in the marketplace, and it is indeed well-packaged and promoted. WebSite Pro is a great product with which to catch your intranet mice. ☺

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Internet Platform and Tools Group

As a member of the **Internet Services Business Unit**, your primary responsibilities will include designing protocols and software for multicast HTTP on the Internet. Qualifications should include a minimum of 3 years of experience as a project leader in an Internet environment. Experience with protocol design, HTTP, DNS, RTP/RTCP, Windows, Windows NT, and Internet client and server applications preferred. Detailed knowledge of TCP/IP and Windows architecture required. Familiarity with the IETF and demonstrated ability to supervise

staff and meet deadlines preferred. A BS or MS degree in Computer Science or related technical discipline preferred.

NETWORK ENGINEER

The Microsoft Network

As a member of the **MSN Operations** team, you will be responsible for diagnosing network routing, authentication and name resolution problems for Microsoft Network (MSN) customers; configuring routers and network management systems in a global, multi-protocol network; insuring real time monitoring and alarm capability for network devices; providing periodic 7x24 on-call support; and assisting in the evaluation and lab testing of new equipment, protocols, tools and network services. A minimum of 5 years' experience in Data/Telecommunications industry in a network operations role. Must be skilled at using packet sniffers and an expert at router configuration and protocols. Familiarity with async modems, and a detailed knowledge of the Internet and its protocols and operation required. A BS degree in Computer Science or Electrical Engineering preferred.

SOFTWARE DESIGN ENGINEER

Desktop and Business Systems

As a member of the **Windows NT** development team, you will be responsible for enhancing various components which are part of the TCP/IP suite of protocols. This includes working on the TCP/IP stack itself and applications such as Telnet, FTP, IPR/LPD, DNS, RSH, and REXEC. A minimum of 2 years demonstrated programming experience in C and a strong familiarity with TCP/IP and related protocols a must. Demonstrated ability and interest in developing systems level software and knowledge of operating systems principles is essential. A BS or MS degree in Computer Science required.

SOFTWARE DESIGN ENGINEER

Desktop and Business Systems

As a member of the **Exchange** development team, your responsibilities will include working on the message transfer and storage for the Exchange Server. This includes working with key people owning other components of Exchange (client, server and MAPI layer) to track problems and do performance optimizations for

client/server interactions. Demonstrated experience in client/server design and implementation, as well as strong Windows application design and development experience required. Multithreaded and client/server programming experience with OLE and Win32 APIs preferred. Skills in programming methodologies involving code core development for multiple platforms (Windows, Windows NT, Windows 95, MAC) desired. A BS or MS degree in Computer Science or a related technical discipline is required.

SOFTWARE DESIGN ENGINEER

Internet Platform and Tools

As a member of the **Normandy** development team, you will be responsible for designing and developing software for distributed security for Normandy which includes the areas of remote authentication, distributed access control, encryption, electronic billing and large scale pri-

vate/public key infrastructure design. A strong networking and distributed security background with preferably NT programming experience. A BS or MS degree in Computer Science or related technical discipline preferred.

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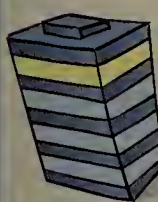
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How 'suite' it is: Vendors bundle software for intranets

BY PEGGY WATT

Looking for a browser, an HTML editor, some Web server software and database connectivity tools? Chances are, you won't have to look beyond a single vendor. From the client to the server, for the administrator, application developer, designer or user, the word in intranet circles these days is "suite."

As vendors fill out their intranet product lines, they're creating bundled offerings with all the tools needed for a particular intranet component. IT managers can pick among a range of suites that combine Web technologies or that integrate Web wares with existing systems, such as E-mail and databases.



Suites

Distinct Corp. (distinct.com) has packaged a number of applications it previously sold via OEM channels in the Distinct IntraNet Suite. The company wants to provide several full-featured products, rather than a huge family of single-task applications, says Chris Apap-Bologna, marketing director at Distinct.

The suite includes Distinct NFS for file and program sharing; Distinct NetRover, which features basic intranet tools such as a browser, E-mail software, a File Transfer Protocol (FTP) client and a news reader; Distinct IntelliTerm, a terminal emulator; and Distinct Intranet Server, which is used for managing network resources. It also includes a few smaller utilities.

"Companies can mix and match the components, but we combine applications into a single interface," Apap-Bologna says.

The suite, which costs \$425, is available for Windows NT and Windows 95 environments.

NetManage, Inc. (netmanage.com) targets the intranet with its fall update and repackaging of the Windows-based ChameleonNFS/X, a desktop client suite. ChameleonNFS/X Version 6 bundles most of NetManage's client products, including its Network File System (NFS) applications for Unix integration, the X Server emulation program previously called Xsoftware and the recently acquired Z-Mail Pro E-mail package.

The suite also provides a host of intranet management tools, such as those supporting remote management, bandwidth allocation and service-level selection. Additional modules provide data encryption and compression.

As part of the suite, NetManage also offers HostLink, its host access program. HostLink combines support for mainframes, midrange computers and IBM's System Network Architecture.

Z-Mail integrates with Chameleon's Web functions, says Fritz Mueller, product-line manager at NetManage. "If you're in E-mail and click on a link, the program brings up the URL inside the E-mail instead of jumping to a different application," he says.

The ChameleonNFS/X suite also includes a revamped version of Chameleon's news reader. It integrates with Z-Mail Pro and supports Multipurpose Internet Mail Extension (MIME) and HTML attachments through the E-mail functions. For intranet use, network managers can define groups and block unauthorized access.

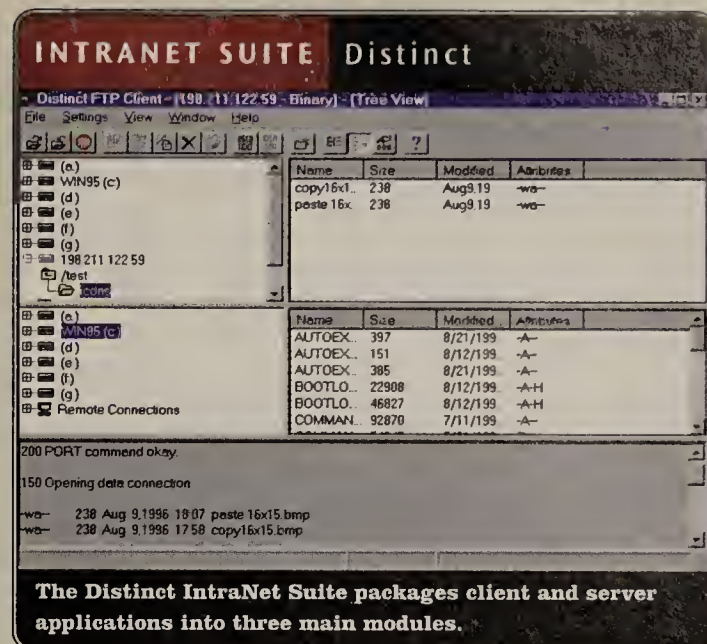
Users also get a quicker way to access frequently used applications, through a new Go! IntraNet button on the application tool bar. By hitting the button, users get a menu of most common applications and Web hot lists.

The updated ChameleonNFS/X suite will ship for all Windows environments by the end of the year, priced at \$400 per single-user copy.

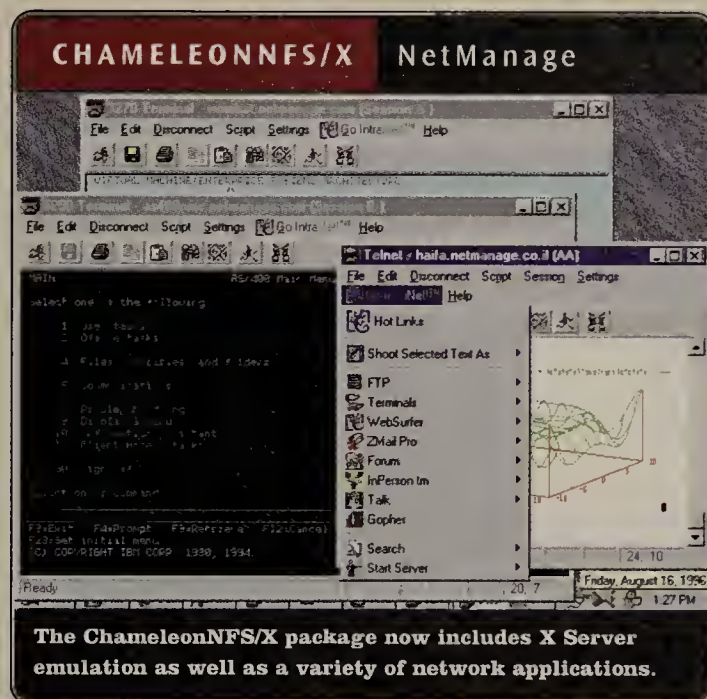
Another veteran suite developer, InterCon Systems Corp. (intercon.com) recently updated its cross-platform tcpConnect4 suites.

The tcpConnect4 applications are installed through a single interface and appropriate functions are integrated, says Dave Saunders, product manager at InterCon Systems. For example, the E-mail system can launch a browser and retrieve data if a URL link is included in a message.

The E-mail system also supports MIME and Apple's QuickTime multimedia pro-



The Distinct IntraNet Suite packages client and server applications into three main modules.



The ChameleonNFS/X package now includes X Server emulation as well as a variety of network applications.

gram, so multimedia files can be played within messages. Other components with new or stronger features include the FTP client, the terminal-emulation program and the user interface, Saunders says.

The suite is available for Windows 3.1, NT and 95, as well as the MacOS. It comes in different editions, ranging in price from \$115 to \$495 for a single unit. Volume pricing and site licensing are available.



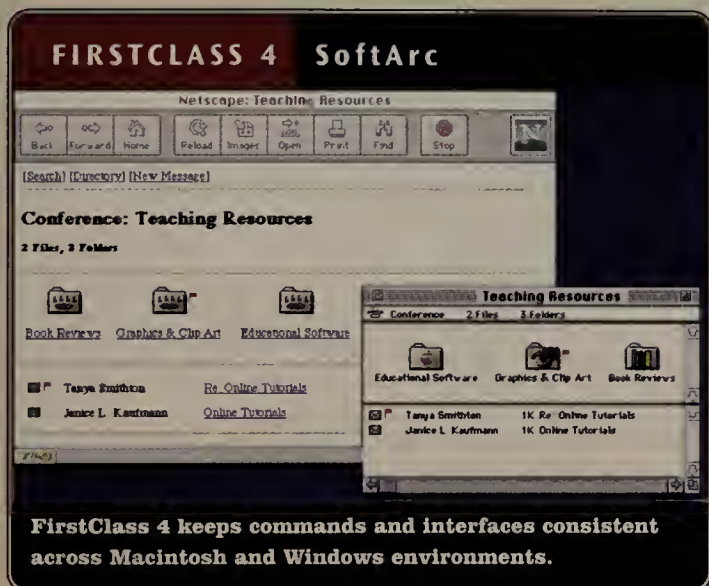
Collaboration tools

For the intranet, vendors are stretching the functions of their E-mail products to support more collaborative features.

For example, E-mail developer Baranof Software, Inc. (baranof.com) has created an E-mail management suite tailored to intranets. Mailcheck: Intranet Edition, which is available for \$695, has built-in monitoring functions, viewers for different E-mail clients and support for common Internet protocols.

Mailcheck provides service reports that track and measure reliability, based on such factors as usage, response times, error counts and the consistent availability of links. "With an intranet, if you can't monitor it, you can't measure it and know whether you're meeting reliability goals," says John Casey, vice president of busi-

See Product Watch, page 20



FirstClass 4 keeps commands and interfaces consistent across Macintosh and Windows environments.

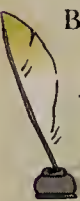
PRODUCT WATCH

Product Watch, continued from page 19
ness development at Baranof.

Baranof also is working on integrating products from other intranet tool developers, notably NetManage and Netscape. Some Mail-check information can be retrieved through Web browsers, and Baranof is working with Netscape to integrate with some Collabra groupware technology.

Mailcheck: Intranet Edition supports Post Office Protocol, Simple Mail Transfer Protocol (SMTP) and Simple Network Management Protocol.

In addition, Baranof plans to add to its intranet lineup this quarter a product called IP.Check. It performs real-time service-level monitoring of Internet and intranet services. IP.Check tracks usage and performance of FTP, HTTP, Network News Transfer Protocol and SMTP servers. Beta versions are available from Baranof's site on the World-Wide Web.



Authoring/development tools

One way to tell integration is for real: It's getting tougher to segment products. SoftArc, Inc. products (SoftArc.com) could easily fit into the Collaboration tools category, but the longtime E-mail developer heralds its newest version of the FirstClass product line as a development platform for messaging and groupware applications. FirstClass 4, scheduled to ship in the first quarter of next year, adds intranet and Internet access applications, a visual application development component and enhancements to existing groupware features.

"We're aiming this at companies that are looking to build some internal infrastructure," says Scott Welch, SoftArc vice president. "It's not just about publishing, it's about collaborating."

Welch describes the new application development functions as similar to Microsoft Corp.'s Visual Basic environment. It includes platform-independent Rapid Application Development tools and uses a simple Basic syntax.

Administrators can customize the collaborative functions, change menu options and defaults and link FirstClass 4 applications to SQL or Microsoft Open Database Connectivity (ODBC) databases, Welch says. "Or," he adds, "the manager can alter the whole environment with graphics or other aspects of the interface."

SoftArc bundles an icon library to get users started on tailoring the applications.

Other new management features include a message history function, which tracks the routes and readers of E-mail or newsgroup messages, Welch says.

SoftArc announced FirstClass 4 shortly after the August release of FirstClass 3.5, which added spell-checking, local replication of E-mail and discussions and some development functions through a Client Extension Toolkit. FirstClass 3.5 server licenses, including support for five clients, cost \$495; additional user licenses range from \$35 to \$79, depending on volume. Pricing for FirstClass 4 will be announced upon its release.

Cognisoft Corp. (cognisoft.com), a startup cofounded by a number of former Microsoft employees, is working on a product that is not quite a development environment, but definitely a means of customizing the intranet. The product, called IntelliServ, is based on the information push model, which helps users retrieve only the information they want by letting them define interests and filter the data, says Ken Schneider, company president.

"We consider it a way to make user-initiated applications," Schneider says. "Intranets can be just another data source to overload users."

Users designate sources to monitor. Choices range from Web and file servers to collaborative environments such as Microsoft Exchange and Lotus Development Corp.'s Notes, and any ODBC database. Data sources can be inside or outside the firewall, Schneider says.

What's more, users can set the IntelliServ system to scan for a vocabulary of terms, topics and word combinations. The system uses a combination of search engine technologies, Schneider says.

The program's notification manager delivers the information to the user in any of several designated methods, such as via a custom Web page, E-mail, on-screen alert notes or even by pager. Different data can prompt different response notices.

Network managers can monitor the information flow, and use the access trends to decide on changes in configuration or bandwidth, notes Tony Liano, Cognisoft's vice president of sales and marketing.

The program will run on Windows NT Server, but can interact with any Web server, Liano says.

IntelliServ is expected to ship in January. Pricing will be announced upon release, but is estimated at \$5,000 for server licenses and \$100 per client.

Borland International, Inc. (borland.com) is squarely in the development tools business, and is moving into the intranet space with offerings that bridge several of its existing technologies.

Borland's IntraBuilder family is a line of customizable intranet application suites that connect to a number of data-

bases and include basic Web and browser components. All support Sun Microsystems, Inc.'s JavaScript and Microsoft's Active X controls, says Ross Dembecki, group product manager of Borland's intranet products.

IntraBuilder Professional includes Netscape's FastTrack Web server and the Navigator Gold page design program. It supports remote access to Borland's InterBase database server, as well as Microsoft SQL Server and most desktop databases.

IntraBuilder Client/Server includes IntraBuilder Professional plus drivers for major corporate databases, such as Oracle, Sybase, Informix and DB2, as well as ODBC support for others. This version also bundles Remote IntraBuilder Agents that enable distributed data management.

Borland also is releasing an entry-level version of IntraBuilder that includes the company's Personal Web Server plus Navigator Gold and supports Borland's Paradox and dBASE and other desktop databases.

"We want to bridge the worlds of client/server, intranets and object modeling," Dembecki says.

IntraBuilder includes a library of images, templates and scripts to help users get started.

It can be used with Borland's database-oriented Delphi programming environment.

Available now, the entry-level product costs \$99.95, the Client/Server edition is priced at \$1,995 and IntraBuilder Professional is \$499.95.

An application-specific but widely applied development tool and service tailored to intranets is available from CenTor Corp. (centor.com), which has a history of data organization and retrieval products. The company's CenWare software line provides authoring and retrieval tools, usually for putting existing catalog information in a form for online access — and, lately, access via Web browsers on an intranet.

"We have some conversion tools to get most file formats into a form we can put onto a Web server," says Chris Nunez, CenTor chief technology officer and cofounder. The company started putting catalogs on CD-ROMs, and has expanded to support Web-based systems.

CenTor markets both the tools and the service for fees that vary with the project size, but in the range of \$50,000 for a catalog of 10,000 entries, Nunez says. He acknowledges that's often a big bite-the-bullet initial cost to move from existing electronic formats to a Web design, but notes the switch makes the data more widely accessible and more easily updated.

Customers can contract with CenTor for content maintenance or they can do their own upkeep.

CenTor uses an HTML extension called HyperMedia Optimized Retrieval Format to index and manage the catalog data on a Web site, Nunez says. Developers can index on any desired fields or items, depending on the formats. The company also builds a series of query templates for common searches via Web browsers.

CenTor's technology is available on Unix, NetWare and Windows NT systems. ☐

Just the Facts

INTRANETS IN ACTION

Administrative	50%
Personnel/inventory reduction	25%
Sales	10%
Various	15%

SOURCE: UTOPIA, INC.



Creepy, crawly COMMANDOS

BY ADAM GAFFIN

Can an intranet be too successful?

For a while, it seemed that way at SGS-Thomson Microelectronics, a multinational concern headquartered in Paris. So many departments had set up Web servers for internal use that MIS had no way to track them — or the resources they housed.

On the other side of the Atlantic, Texas Instruments, Inc. was facing a similar problem: With a large and growing number of intranet sites, how would users ever be able to find information quickly?

Both companies turned to spiders for help.

Spiders use recursive searching to catalog a network. An administrator points a spider at specific Web servers. The spider creates an index of the home pages on those servers, then follows the links from each page to other pages, which, in turn, are also cataloged and searched for new links. This continues until all linked information is indexed in a database on the spider's own server.

Let the spider keep on indexing, and chances are it will eventually index virtually every Web site on the global Internet, assuming you give it enough disk space and a powerful enough processor to crunch all those millions of pages and links. That's the basic principal behind such public search engines as AltaVista, Webcrawler and Lycos.

Although created to catalog HTML documents, spiders also can index other types of documents, from those stored in the Adobe Systems, Inc. Portable Document Format (PDF) to Microsoft Word documents.

But as SGS-Thomson, TI and other companies that have unleashed spiders have learned, effective use requires a fair amount of planning to minimize the impact on the network and the servers being cataloged. To ensure a consistent look and feel for documents called up in a search, companies may also have to develop enterprise specifications for page design and formatting.

Fortunately for intranet managers, most spiders come with configuration files or other methods for limiting the scope of a search to a particular domain or set of servers. A growing number of spiders also track when they last visited a particular page. If the page has not

been changed since the last visit, the spider goes on to another page.

Some spiders attempt to catalog a Web server in one visit, which can require off-hour runs. Others perform incremental indexing of sites, meaning they take several visits to create a catalog, reducing the load on those sites at any given moment.

Intel Corp., for one, uses both approaches. Each night, a series of spiders incrementally scans internal servers, so that the entire network is reindexed about once a week.

The other role of the spider is the one seen by the user: the search form and its underlying search engine. Each spider uses a different set of algorithms for matching user queries to items in the database, but typically some form of Boolean search is implemented. Any matching links are displayed in a menu that lets the user jump to

those files with a mouse click.

As with other Internet-based technologies, the earliest spiders were developed by or at educational institutions. For example, Harvest was developed at the University of Colorado and Lycos at Carnegie Mellon University. Several companies, including Digital Equipment Corp., Netscape Communications Corp., Open Text Corp. and Verity, Inc., now either sell or are beta-testing spiders.

SGS-Thomson

SGS-Thomson Microelectronics couldn't wait for a commercial spider. Earlier this year, a corporate task force looking at intranet use realized it could not really map out any guidelines without first figuring out what was already up on the internal network, says Gilles Simon, corporate E-mail manager.

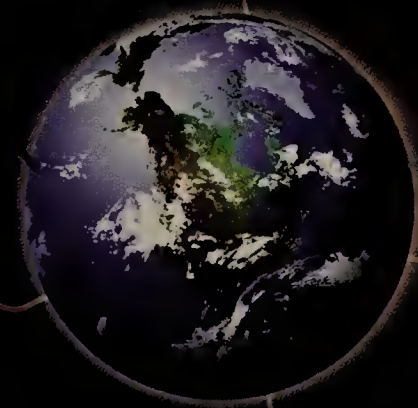
According to Simon, net managers knew a growing number of departments were setting up internal Web sites, but finding out how many and what they were publishing looked to be an impossible task in a worldwide enterprise. Suddenly, MIS had a new priority: "Control the anarchy or die," Simon says.

Simon says he and coworkers decided to try a spider as the first crack at Web asset management and to develop an enterprise infor-

See Spider, page 24

SPIDERS ON THE WEB

AltaVista:	http://altavista.software.digital.com
Harvest:	http://harvest.cs.colorado.edu
ht://Dig:	http://htdig.sdsu.edu/
Open Text Livelink:	http://www.opentext.com/livelink
Netscape Catalog Server:	http://home.netscape.com/comprod/server-centra1/index.html
Verity:	http://www.verity.com



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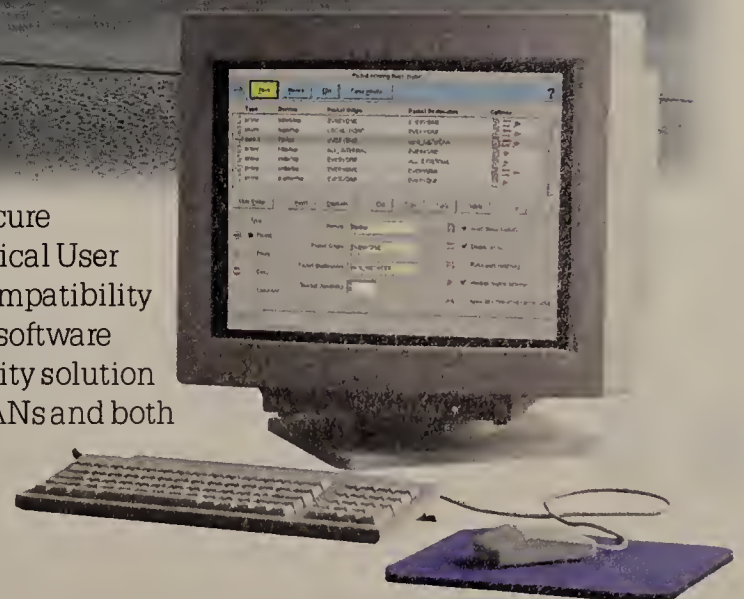
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Support for Multiple Virtual Secure Environments, a Remote Graphical User Interface manager and Intel compatibility mean CyberGuard Firewall 3.0 software delivers a hardened high-security solution on off-the-shelf hardware for LANs and both physical and virtual WANs.



Spider, continued from page 21

mation index. No commercial spiders were available, so SGS-Thomson turned to ht://Dig, a freeware Unix spider developed by a systems analyst at San Diego State University.

According to Simon, ht://Dig is relatively easy to set up via a configuration file, is efficient and can be set to limit

its searches to servers within the company domain. The latter can be particularly important for efficient use, because otherwise the spider will follow links offsite and begin trying to catalog the entire Internet.

Every night ht://Dig is pointed at a list of known internal servers, with the hope that somewhere on them are

links to new servers unknown to MIS.

To make information navigation easier for users, the company's MIS department is developing a Web style guide so that pages look consistent. At a minimum, the guide calls for use of HTML 2.0 (essentially, classic HTML plus tables) and Adobe Acrobat PDF for read-only information.

"The power of our intranet will be measured by its ability to get, retrieve and deliver the right information at the right time," Simon says.

No matter the content, the key is a powerful search engine. The spider, based on a Unix workstation, runs at night (in Paris) and takes about two hours to index 8,000 documents on 30

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Circle Reader Service #6

SPIN AWAY

Unleashing a spider requires forethought. Here are some issues to consider:

Do you need one?

If you only have a few servers, a spider might represent overkill. Even freeware spiders can represent a significant cost.

"Many corporations say, 'Hey, this is the newest trend, let's put it in,'" says Bryan Cromartie, a programmer/analyst with JLS Software Services, in Memphis, Tenn. "But the question is, 'How many documents do we have that change that rapidly?'"

If you have dozens of servers, or if your servers house thousands of documents, then spiders might be the only way to bring information order out of chaos, says Issac Roth, an intranet consultant with On-The-Net, a San Francisco-area consultancy.

How will others react?

Some people fear a spider will generate too much network traffic and drive up server usage, Roth says. In fact, "most robots are fairly well-behaved" and can be configured to minimize network and server impact. Internal Webmasters also can be a spider-master's best friend. Many spiders require lists of Web sites to begin their search, something these employees can provide.

Minimize the impact

Run the servers in incremental mode at night or on weekends. And no matter how well-behaved, spiders need human supervision — they can choke on some files and hyperlinks, Roth says.

Stock up on drives

Make sure you have plenty of disk space, and consider limiting how much of a document is indexed. An index of 80,000 documents at Texax Instruments, Inc. takes 4G bytes of disk space.

Carefully limit the reach

Try excluding certain types of files from your search, such as compressed and graphics files. They can hang some spiders.

servers in Asia, Europe, the Pacific and the U.S. Users can access it via a central page dubbed SGS-Thomson City.

Texas Instruments

Like SGS-Thomson, TI has seen an explosion of internal Web use, says Don Rolph, manager of engineering system support at TI's Materials and Controls Group in Attleboro, Mass.

One thing the company wanted to avoid was replicating its experiences with a mainframe-based system that proved remarkably difficult to get information out of, he says.

Rolph set up a spider using Harvest, an early Webcrawling program that efficiently uses network and system resources, he says. Harvest is extensible (it comes with source code), is kind to networks and servers, and costs far less to install than its commercial cousins, he says.

Rolph quickly ran into three major problems. He found on a large network, such as TI's, an index can grow to monstrous size, certain file types can crash or hang the spider server, and finding servers not yet linked to in-

Harvest also proved unable to handle files compressed with the Unix command; they tended to hang the spider, Rolph says.

A number of files compressed with MS-DOS or Unix zip programs caused similar problems. As a result, the spider now excludes these file types.

Anyone within TI can set up a Web server. Webmasters are encouraged to

register servers in a central directory, but this is hit and miss. "I use this as a starting point," Rolph says. "The spider-master has to continually be on the lookout for new Web servers."

By design, Harvest indexes incrementally. This means the network is reindexed every two weeks or so. Because of this approach, the load on most servers is fairly low, Rolph says.

As for security, Rolph says it is up to local Webmasters to secure their servers so material not ready for enterprise access is kept private. This is done via both Unix file permission settings and robot.txt, a file that tells incoming spiders which files or directories to avoid.

At TI, the spider's popularity is spreading, Rolph says. "I now typically get several hundred queries a week." ☺



SHAWN HENRY

The Harvest spider spins its web at TI, says Don Rolph, an engineering manager at TI.

dexed sites by hyperlinks can be a challenge.

Rolph says his spider currently requires some 4G bytes of disk space for an index of roughly 80,000 documents on 133 servers around the world.

The spider indexes HTML, text and PostScript files, along with C code and executable-file names. Next up are Word for Windows documents and Excel files.

"Full-word indexes of all documents will destroy virtually any corporate system," Rolph says. So he set Harvest to stop cataloging documents after a certain number of characters. He also excluded graphics files, which by their nature do not index very well, and Common Gateway Interface scripts — which can be large and which most users will never need to know about.

(Intel also uses Harvest for an internal spider. The company now runs multiple gatherers because it was taking just one spider as much as 24 hours to compile an index of the internal Web net, says a company spokesman.)



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COOPERS & LYBRAND
GETS ON THE INTRANET TRAIN
WITH AN AMBITIOUS
CORPORATE KNOWLEDGE
BASE PROJECT

Making

When a telecommunications consultant at Coopers & Lybrand LLP needs information to put together a client proposal, he immediately heads to the nearest subway stop — figuratively, that is.

A graphical subway station offers an entrance to Cooper & Lybrand Intellectual Capital (CLIC), one of the busiest stops on this young corporate intranet.

A consulting firm's intranet doesn't provide life-and-death answers like an emergency room database, or offer the kind of off-road access a remote construction crew might appreciate from a satellite hookup. But intellectual capital fuels many a corporation, and Coopers & Lybrand LLP is finding golden spikes in its intranet track.

"A consulting firm's product is an intellectual one. It's increasingly important for consultants to develop technological means of doing their work and producing that product," says John Clippinger, who developed the concept for Coopers & Lybrand's intranet before the World-Wide Web was even created.

As director of intellectual capital in Coopers & Lybrand's Washington-based National Office of

resources, which would be updated constantly. And he wanted employees to be able to get at the knowledge base whenever or from wherever they needed. In short, the knowledge base would fuel a company that deals in intellectual capital.

Learning & Education's mission is training and professional education, and growing such a repository was exactly the way to enhance corporate knowledge, Clippinger reasoned. Add communications and collaboration tools and the company could take better advantage of its own geographically dispersed resources. For example, analysts in different offices could discover their overlapping research and collaborate. Partners could share online subscriptions to professional publications instead of duplicating the orders.

His vision eventually resulted in CLIC, a growing online resource managed by the Learning & Education office. It has been available to a limited alpha audience for about two years, and is scheduled to be opened to the entire firm this for beta testing, and finally deployed by the end of the year. When CLIC flings open its doors, it will be but one site on an intranet that reaches all 16,500 Coopers & Lybrand employees worldwide.

Work on CLIC started early, but as word of its development seeped out and interest rose in the World-Wide Web, other business units in Coopers & Lybrand jumped on board the intranet train.

ZIPPING ALONG

Company: Coopers & Lybrand LLP

Employees: 16,535

Offices: In 100 U.S. cities, 125 countries

Provides consulting for these industries: Energy, utilities and natural resources; financial services; government; health care; higher education; high technology; insurance; manufacturing; real estate; sales; telecom; transportation; venture capital

Home page: <http://www.colybrand.com>

departments, Clippinger devised a knowledge base scheme that went beyond the capabilities of available technology. He planned to build CD-ROM libraries, which would be updated frequently and distributed widely across the Coopers & Lybrand network. Users would retrieve the information through a Lotus Development Corp. Notes interface, since the firm had committed to a corporatewide deployment of the groupware product.

Web technology changed the plan. The browser offers an easier, more intuitive desktop retrieval tool, and Web servers provided a clearinghouse for the disparate information sources. Coopers & Lybrand researchers could dial up clients' and competitors' public home pages or access familiar government databases through federal Web sites.

In 1993, Clippinger revamped his design and began testing an early version of CLIC, using shareware and giving limited access to corporate testers. He posted the first parts of the corporate knowledge base on an Apache Web server developed by the National Center for Super-computer Applications and made it accessible via Mosaic browsers.

"A key design requirement was to automate the design of pages and make lots of links," Clippinger says.

Programmers from IT built Common Gateway Interface scripts that glued the Web server to existing databases, and CLIC architects combed the company's resources for databases to link in. All corporate white papers went online, for example, as well as research studies and even notations of projects in progress.

To ensure users would embrace CLIC, the developers decided it was crucial to involve them frequently, intimately and on a continuing basis through the life of the project. In fact, Learning & Education staff chose its alpha project partly based on which department was willing and interested in

See Coopers, page 28

Clippinger wanted to leverage the firm's resources — all employees — to create a knowledge base that would draw from external sources like trade press, newspapers and journals, company staff writings and publications, and include outside studies and news from specific industries served by Coopers & Lybrand consultants.

Clippinger also emphasized the use of a powerful search engine to find and access knowledge base

Other components of the Coopers & Lybrand intranet include the CyberLYB, which is expected to replace the firm's traditional libraries and make resources accessible regardless of geography. The internal Web also has a human resources section that provides employee manuals, regulations and references online. And Coopers & Lybrand's intranet home page offers controlled links to outside sources, including customers and competitors.

Digging the subway station

Challenged to mobilize information across

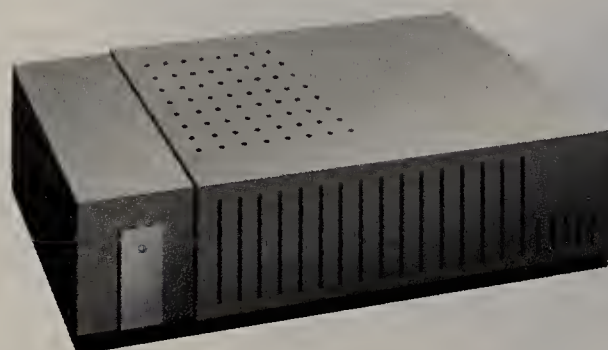
Laura Higgins, project leader for Coopers & Lybrand LLP's CLIC intranet sites.

tracks

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Modem / 28.8 Kbps



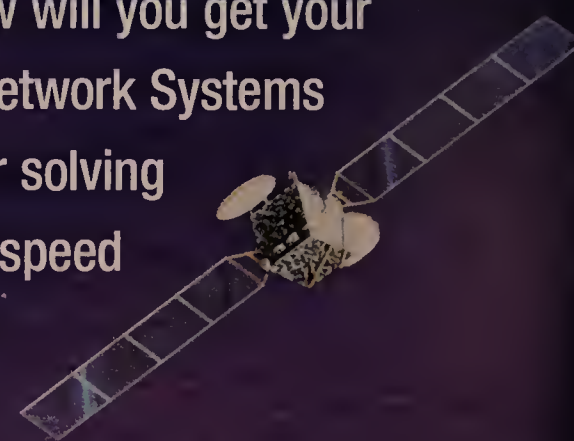
Frame Relay / 56 Kbps



ISDN / 128 Kbps

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Coopers, continued from page 27 helping design the program. So, the first subway stop became the Telecom and Wireless industry group (recently renamed Infocom).

Construction phase

Laura Higgins, now CLIC project leader and fervent champion, joined Coopers & Lybrand to build that first online subway station. Getting the telecom industry unit's knowledge base on track took almost two years; now, thanks to Higgins' streamlining, the CLIC crew cranks 'em out at roughly six-month intervals.

Higgins asks partners and managers in each industry unit to commit to about three days of sketching out what they want on their site, implemented as a stop on the metaphorical subway line.

"We stay close to those users, because they are my clients. They help develop the taxonomy of the system we design for them," Higgins says. "If the users don't see the value in the product, and don't see how it will help them do their jobs, they won't use it."

Working with the telecom industry group, CLIC designers modeled a generic framework that has basic categories for resources and services. Common topics are vendors, competitors and issues. Subdepartments are usually specific to the industry groups.

One key feature is the Personal List,



When he's not working the land, John Clippinger, director of intellectual capital at Coopers & Lybrand, prepares corporate Web sites.

where users can bookmark frequently used links, save search queries and store topic lists, which they can group by project or client. "Users need to be able to tailor all of this into a desktop of information they want," Higgins explains.

Another user-requested page is the Client Service Center, based on a generic design usable for all industry groups with some site-specific categories. It lists corporate resources by business units (such as accounting, finance or tax information), cross-

indexed by industry category. Each Client Service Center also includes an industry-specific directory of related online publications, Learning & Education curriculum, a client database and links to client Web sites.

"Coopers & Lybrand clients want our consultants to have a big picture of their needs," Higgins says. "They want us to be current, and to know as much, if not more, about their industry as they do."

The task is daunting, but once consultants see the potential information gold mine in the intranet, they deluge the CLIC designers with requests for resources they want put online, Higgins adds.

Every CLIC page includes buttons to get online help, send feedback or call up site maps. Users requested this online map to help them retrace their steps and visualize where they found resources, Higgins says.

"The system complements what we had already with Notes and E-mail, but adds a lot of resources," says Bryan Kester, an associate with internal services for the Business Assurance practice in San Francisco.

Kester stumbled on the site while browsing through other parts of Coopers & Lybrand's intranet, which started to take shape about a year ago. He requested access, and Higgins gave him a password to test the system. He

finds it a "phenomenal" resource and is eager for his business unit to get a subway stop.

"Our firm is trying to be on the cutting edge of information management, but we need something like this to cut through the jungle of information," Kester says.

Although Higgins and her associates have become adept at basic HTML, the heavy programming duties are shared by the in-house IT staff and Context Media, Inc., a Boston design firm Clippinger founded when he left Coopers & Lybrand last year. Today, the Learning & Education office outsources the bulk of the content-preparation duties to Context Media, which also uploads updates and monitors usage.

Higgins calls Context Media's contribution largely editorial; in-house IT maintains equipment but is not involved with content. In fact, IT has taken a low-key role, deploying technology on request but sharing decision-making about equipment with the intranet designers.

It helped when developing the first knowledge base that Higgins has a background in the telecom industry, but neither Clippinger nor Higgins thinks CLIC needs an in-house expert with every phase. Rather, giving the interest in CLIC, what the staff needs are more energy and time. The next

SITE SEEING

A step-by-step guide to Cooper & Lybrand's intranet

Research on the Web

An associate partner in Coopers & Lybrand LLP's Business Assurance unit is collecting information for a report on conversion issues for the year 2000. She wants to find out what the company's client and prospective client IT departments are doing to prepare for the changeover to the year 2000. What's more, she wants to learn what practices the consulting firm's competitors are promoting regarding the issue.

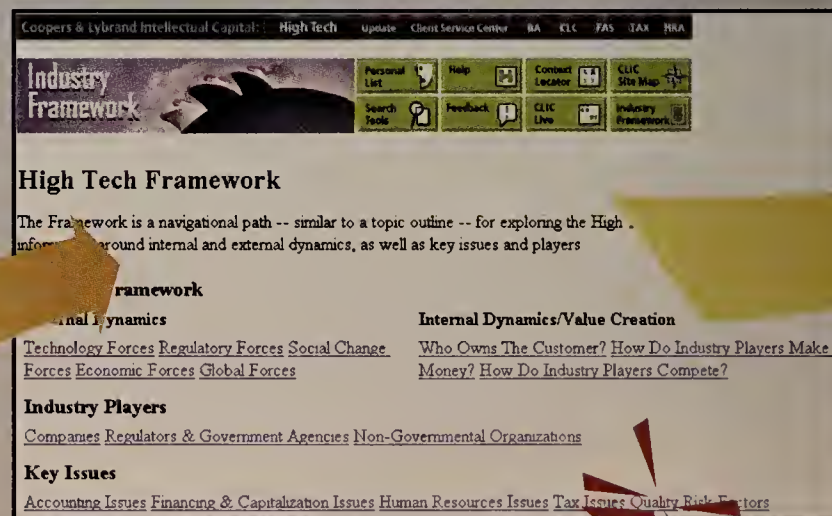


1

To begin her research, the associate partner logs into the corporate intranet. This brings her to the C&L Internal Home Page, which provides hotlinks to a variety of resources. She clicks on the Industries button to get to the home page for the National High Tech Group.

2

The High Tech group's home page is part of the Coopers & Lybrand Intellectual Capital (CLIC) portion of the intranet. She chooses the Industry Framework button, figuring that will be a good place to start her search for background materials on the year 2000.



3

The researcher goes to the Key Issues portion of the High Tech Framework page and hits the link for Quality to drill down to the next topic level.

CLIC subway stop went to the High Tech industry group; further down the line will come sites for Insurance, Financial Services, Health Care, Energy & Natural Resources, and the remaining industry groups.

Elsewhere on the line

Just as the first CLIC station was going into alpha, Coopers & Lybrand's management took a step that made life much easier for the early intranet architects: It decreed companywide adoption of Netscape Communications Corp.'s Navigator browser. The CLIC staff yanked the Mosaic browsers off the few dozen test desktops and gleefully started crafting Web pages tuned to Navigator. Likewise, CLIC's Apache Web server gave way to a Netscape Commerce Server also running on Unix, which is now standard for Web servers installed throughout the corporation.

Praise for CLIC and consultants' requests for access to external Web resources convinced Coopers & Lybrand's management to deploy browsers on every desktop. And that decision in turn nudged other departments in the company into contributing to a truly corporatewide internal Web.

"This has been a big opportunity for us to pull together our core business systems," says Tracy Beverly, manager of

Desktop Information Services, which is part of the Knowledge Management Group (KMG), a newly created organization that focuses on intellectual capital and oversees the corporate libraries and online resources, including the intranet but excluding CLIC.

KMG, which is housed in Coopers & Lybrand's New York headquarters, combines the company's former Market Risk & Analysis Group, now called Knowledge Strategies Group; Learning & Education; and the IT unit. The group is charged with planning technological development in the firm, which even has a chief knowledge officer.

Not quite a year ago, CLIC became one of several option buttons on Coopers & Lybrand's internal home page. Beverly acknowledges the Learning & Education group's effort as "one very well done piece" that helped inspire construction of the larger intranet, which now runs on two Commerce Servers. She points to other projects, such as CyperLYB, starting to blossom.

"We're transitioning our libraries from brick and mortar to electronic data," Beverly says of the CyberLYB project.

The CyberLYB is becoming a virtual repository for the entire company, liberally applying hyperlinks to CLIC and other sites at various departments,

which are converting their library resources to electronic form. The result will make library materials available to all Coopers & Lybrand staffers regardless of geographic location.

The CyberLYB also is the central site for online services to which Coopers & Lybrand subscribes, such as the Dow Jones News Retrieval service and numerous online newsletters from market research organizations like Datapro Information Services Group and International Data Corp.

Another page, the Tax News Network, was designed by a Washington, D.C.

group of tax directors. It includes a newsletter, news feeds and numerous white papers. Because it is accessible to customers via the Internet, it

is housed on a separate server from the other intranet pages.

Beverly's five-member staff helps interested groups build their own Web sites, and also tries to track down and link in the unofficial internal sites springing up throughout the company. CLIC was a self-contained, creative pro-

ject, but other groups are happy to follow KMG's templates for getting online.

Sometimes her staff prepares content, such as travel policies. Other times, it offers consulting or teaches courses to departments that want to put up Web pages.

"We try to keep the content as close as possible to the people who own it," Beverly says. "Our job is to jump-start and troubleshoot."

Other options on the Coopers & Lybrand internal home page lead to the audit, tax and human resources departments, Newsbytes custom news feed and even to selected World-Wide Web sites, such as customer pages or controlled-access sites run by market research organiza-

tions. The home page also links to Coopers & Lybrand's existing Notes servers, which are very much part of the intranet.

"Notes lets us give people their personalized view and their own documents, and they can maintain the content," Beverly says.

CLIC TIPS

To assess design and content needs, the architects of the Cooper & Lybrand Intellectual Capital Web site ask users these questions:

- ▶ What resources do you use in your job?
- ▶ What existing resources do you find hard to access?
- ▶ What are your typical daily tasks?
- ▶ How important is timeliness?
- ▶ What types of information do your clients request?

4

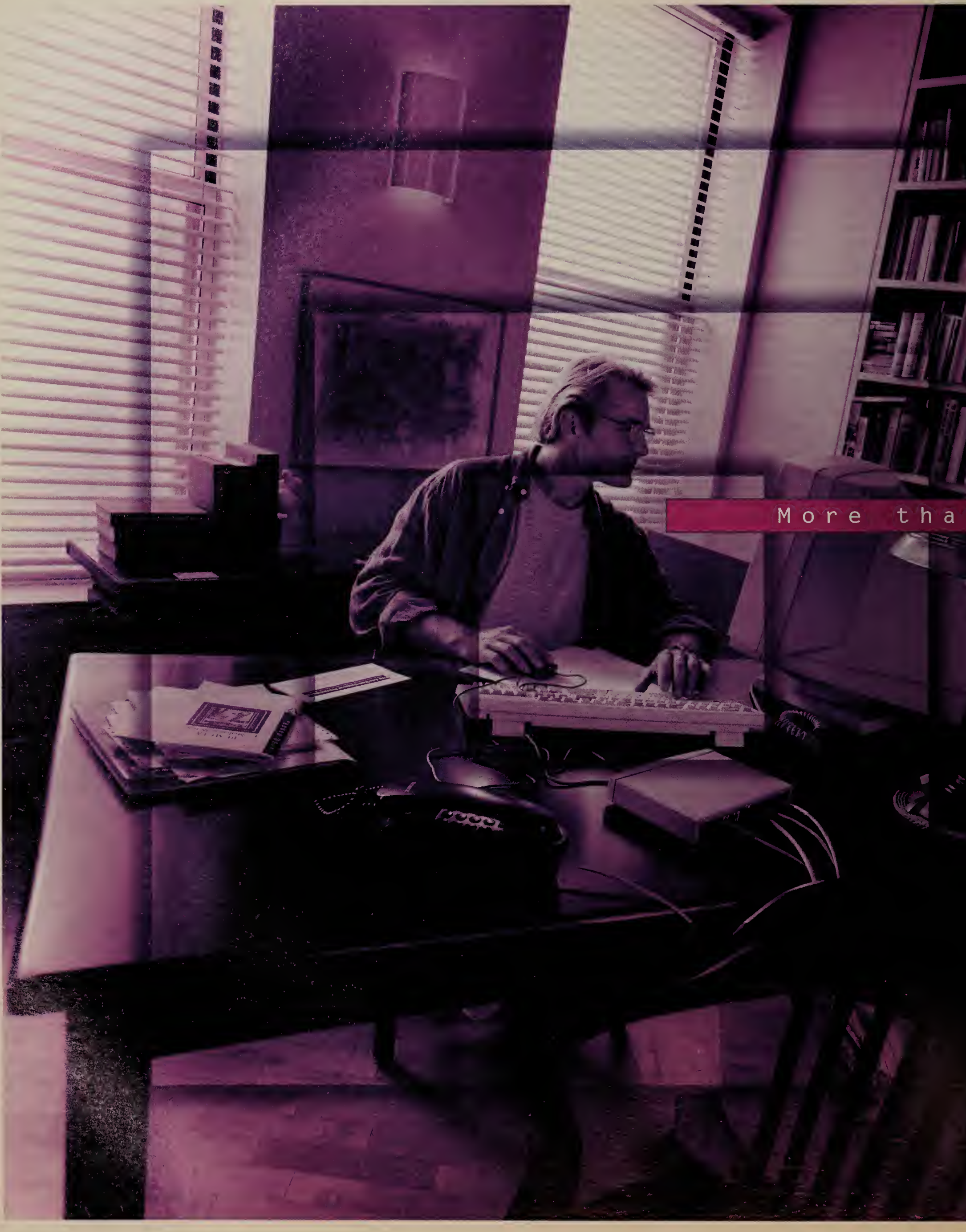
The researcher scrolls through the Quality Topic Sheet and finds just what she needs: a hotlink for Year 2000 Diagnostics. She clicks on it.

6

The researcher can use this matrix of services to find lists of articles or reports different Coopers & Lybrand groups have produced on the year 2000. The researcher gathers the data on the year 2000 housed on the intranet and begins her analysis.

5

On the Year 2000 Diagnostics Topic Sheet, the researcher finds a list of articles about the issue gleaned from online publications and news services to which Coopers & Lybrand subscribes. Before selecting which articles she'd like to see in full, the researcher decides to check out what services the firm offers to address issues surrounding the year 2000. So, she clicks on the Client Service Center button in the toolbar and works her way to the High Tech options.



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Circle Reader Service #7

Coopers & Lybrand is installing Lotus Domino servers to enhance its Notes-Web connection. But the technologies already dovetail nicely; for example, one Web site lets users search a directory of the contents of the company's Notes servers, and then hyperlink to the appropriate server.

Although having a widespread Notes installation presented some technologi-

cal challenge until the release of Domino, the presence of the groupware was also a boon when it came to the intranet, several of its architects say.

"Notes had introduced the idea of sharing, of collaborative teams," Clippinger says. "The intranet enhanced the knowledge flow."

What's more, it set the stage technologically. Because Notes is widely

deployed, most Coopers & Lybrand employees have reasonably powerful systems to accommodate Notes' hefty hardware needs.

All employees, regardless of location, have 486 or Pentium systems; many of the partners have laptops and docking stations. Navigator's installation was accompanied with an influx of modems.

Down the track

CLIC is a case study of long, careful planning and testing but quick deployment once the train got on the track. Its architects understandably have their eyes on the future as well.

"We're excited about the potential of satellite hookups and real-time videoconferencing," Higgins says. "As Netscape evolves, we'll be able to implement innovations such as multimedia E-mail and full-blown discussion groups." The name for it: CLIC Live.

Besides launching CLIC subway stops for the remaining industry groups, the Learning & Education group is posting various existing courseware for access through Web servers. For example, interactive courseware is in the works.

Client access to appropriate portions of the intranet via the Internet is another likely enhancement.

"The big question is security," Higgins says. Coopers & Lybrand employees access the Internet through a proxy server and firewall. She also expects the intranet will have to accommodate more diverse systems in the future. As IT upgrades to Windows 95, for example, users may want to dial in with Microsoft Corp.'s Internet Explorer browser.

But Cooper & Lybrand's careful planning and testing, to work out the bugs before deployment, should help its intranet grow more quickly in the future, Higgins notes.

"Companies shouldn't be scared to take their time," she says. "It's easy to get caught up in the advances in technology and leap in," often to a less than useful result.

She credits Clippinger and Judy Rosenblum, a former Coopers & Lybrand executive who shepherded the proposal through management, as visionaries who heralded an unproven but promising venture. What's more, Coopers & Lybrand was willing to write the check as a long-term investment, without expecting immediate or dramatic return. But those involved agree that such an ambitious project hasn't a chance without an angel at the top.

"You have to have somebody powerful, well-respected and committed to the concept to push it," Higgins says.

The fact that Coopers & Lybrand's first steps to an intranet came from the Learning & Education group shows the company's commitment to intellectual capital, Higgins points out. Organization of the KMG also provides evidences of that philosophy. And both Beverly and Higgins attest to widespread user acceptance of the growing knowledge base.

"When we began to design CLIC, we bit off a lot," Higgins says. "We looked to capture and leverage intellectual capital assets." Because the focus is on content, instead of the technology, the first visible benefits are in productivity rather than financial results. And that's the capital a knowledge company seeks; the other kind follows. ☐

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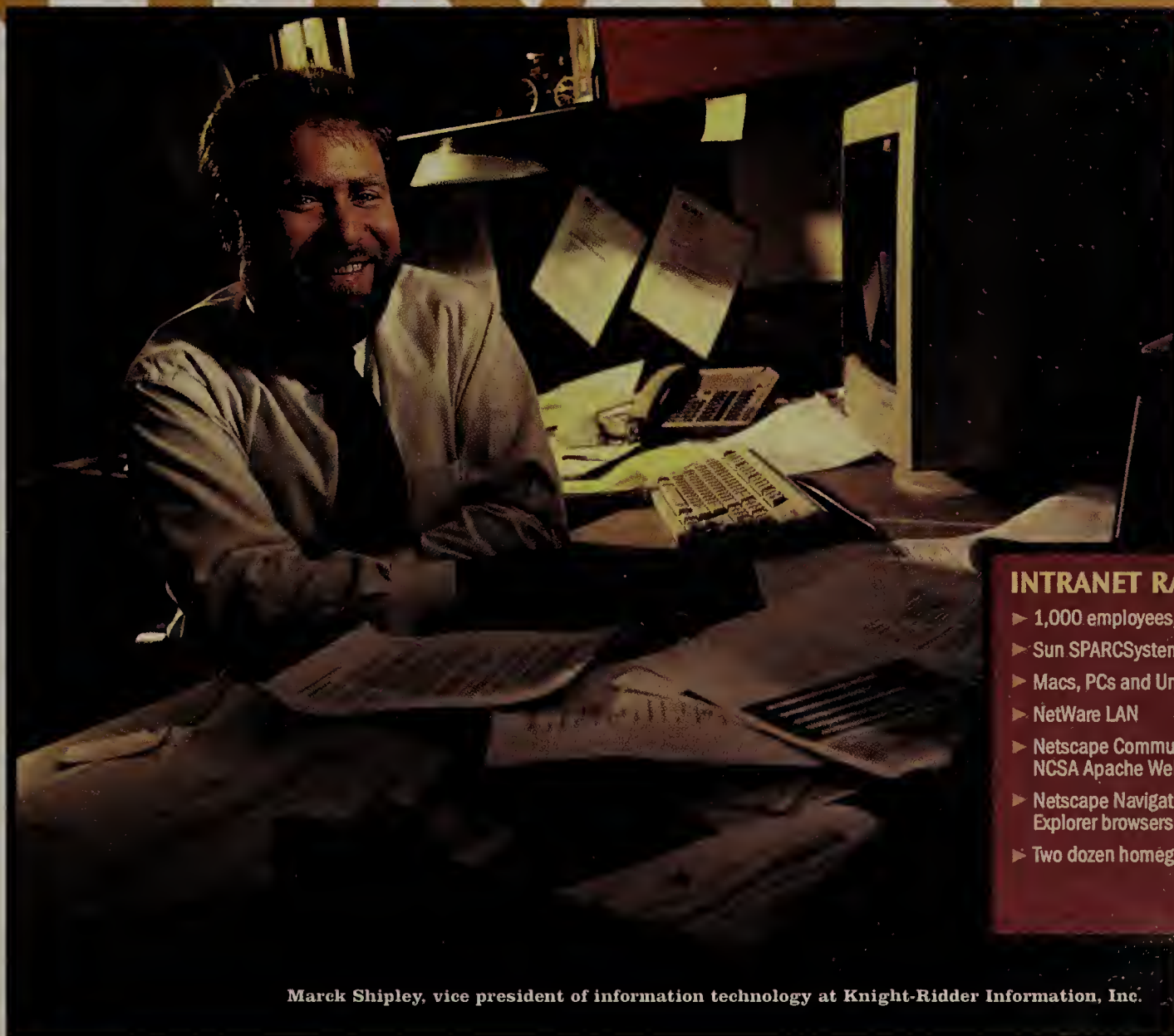
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Mission

Knight-Ridder Information juggles policies, preferences and personnel to build its Web.

INTRANET



Marck Shipley, vice president of information technology at Knight-Ridder Information, Inc.

ERIC MILLETTE

INTRANET RAW MATERIAL

- ▶ 1,000 employees, 500 of them remote
- ▶ Sun SPARCSystem servers
- ▶ Macs, PCs and Unix workstations
- ▶ NetWare LAN
- ▶ Netscape Communications Server and NCSA Apache Web servers
- ▶ Netscape Navigator, Microsoft Internet Explorer browsers
- ▶ Two dozen homegrown Web pages

BY PEGGY WATT

PROJECT
INTRANet
Part 1 of a series.

This is the first in a series of articles following the development of an

intranet at Knight-Ridder

Information, Inc., a 1,000-employee information services firm in Mountain View, Calif.

The company has launched an ambitious rollout schedule for linking its local and remote offices. In this first installment, we describe the evolution of the intranet concept, its rapid prototype and the steps to come.

Knight-Ridder Information, Inc.'s IT manager insists his company is an intranet novice, but this beginner had several dozen working Web sites even before drawing up the blueprints for a formal corporate system.

Like many corporations that have caught intranet fever, renegade sites started popping up at Knight-Ridder Information last year. Employees who were exploring the World-Wide Web decided it was a great way to collaborate, so they simply loaded public domain (usually Unix) Web servers on their workgroup machines. Personal home pages, many festooned with original art and family photos, soon proliferated.

But Marck Shipley, Knight-Ridder Information's vice president of information technology, hasn't had time to build his own home page. He's been too

busy managing the intranet stampede. In fact, the IT department was one of the first to set up a prototype home page. It lists resources, offers forms that can be used to request information or equipment and enables users to report problems.

Shipley is just one of the company's division heads who have already put up departmental Web sites and are sold on the intranet concept. In April, he was charged with assembling a prototype to demonstrate to upper management how the technology could benefit additional departments and the company as a whole.

The first prototype pages, accessible by all employees, went live in August. Corporate management will decide by year-end whether to adopt the internal Web architecture and expand it.

See Knight-Ridder, page 38

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Knight-Ridder, continued from page 35

The intranet experiment is unfolding rapidly and simultaneously with Knight-Ridder Information's overhaul and expansion of its World-Wide Web presence. That project is handled by a different group comprising a mix of corporate departments. But participants in the two projects are sharing ideas and information and plan to keep the design of their Web pages similar for the sake of consistency.

Data at the core

Knight-Ridder Information is no stranger to online information management and distribution. The company includes the former Dialog information service, which Knight-Ridder Corp. acquired last year. It is a sister corporation to the Knight-Ridder publishing group, which includes more than four dozen newspapers and broadcast stations.

The information arm of the company packages and markets not only some of the voluminous product of these siblings, but also information from other sources, such as databases from Standard & Poor's, Dun & Bradstreet Corp., Reuters and the U.S. Patent and Trademark Office.

Royalties for obtaining such third-party information for resale can be high, and one of the benefits Shipley suspects an intranet will provide is a way to keep closer tabs on those costs. He decided to give employees easy access — via their Web browsers — to timely information about customer use of data and

says IT will be happy to ditch that chore. Authorization to access the database is controlled by the same security measures provided through the LAN.

"We've built a real-world application for distribution through the intranet," Shipley says.

Excaliber is just one selection on Knight-Ridder's home page. And while it is arguably the most complete site on the intranet, there are several other destinations.

Pages link to work, leisure

Some home page options lead to Web pages and resources of other departments, such as human resources, finance and IT. Most departments at least have a home page, Shipley says, and some are designing a series of sites.

One option on the home page is a Service Request System that lets users enter requests for help and bug reports. The page also features a suggestion box and survey. An "After Hours" button lets users peruse movie listings and information on other local entertainment, and "Cafeteria" shows the menu choices in the company cafe.

There is also a link to a Table of Contents page with a whole different selection of buttons, many of them personal Web pages designed by employees. IT dispatched digital spiders to find and record the existing Web pages before setting up shop.

"I don't want to have to manage all those servers, but I'll help make them more visible," Shipley says.

"It's to our benefit to get as many people as possible familiar with Web servers and HTML and information distribution."

Because the earliest intranet pages — especially personal home pages — appeared autonomously, they exhibit a potpourri of colors and styles. Shipley encourages departments to look at the pages for inspiration and creative design. The IT staff will help other departments design their pages, if requested, and can provide templates to help groups get started. But Shipley says he

imposes few design requirements.

"We give people a lot of freedom here to try new things," he says. And for personal home pages, imagination is almost the only limit. Shipley believes those pages help employees get to know each other better. For example, an employee might display in the office a few family photos or a picture that hints of a favorite pastime, but a personal home page can communicate much more information — some of it even work-related, he adds ruefully.

However, he does impose one restriction for security purposes. Although many of the intranet pages link to external pages on the actual World-Wide Web, pages on the Internet cannot link to Knight-Ridder Information's intranet. A firewall blocks the links.

The actual design of the corporate Web site is still fluid. Shipley and members of his staff sketched out the initial design for the corporate home page and Excaliber. First, they wrote a wish list of page attributes: what should be included, what it should look like, what should link to what. They drew some concepts from the personal home pages they visited.

Shipley says he's still fine-tuning the prototype so the pages will look good on any of the diverse monitor types used in the company. Notably, all of the prototype Web pages feature lots of feedback opportunities. Shipley wants employees to try out the pages and let him know what they think.

To coordinate the next phase of the prototype, Shipley has organized a cross-departmental commit-



INTRANET INFRASTRUCTURE

Knight-Ridder Information's IT group is deploying its prototype intranet across its existing network infrastructure, which includes a 100Base-T backbone, with 10Base-T to the desktops.

The corporate LAN runs Novell, Inc. NetWare 4.11, and users have a mix of Unix, Macintosh and Windows systems. But every desktop also has either a Netscape Communications Corp. Navigator or Microsoft Corp. Internet Explorer browser.

The network connects 500 employees at the company's Mountain View, Calif., headquarters and another 500 employees across a WAN to remote sites, the largest of which comprises 100 employees in Colorado.

the company's costs for the databases accessed. Closer monitoring of up-to-date numbers could help Knight-Ridder Information better determine if it overpays for what it resells.

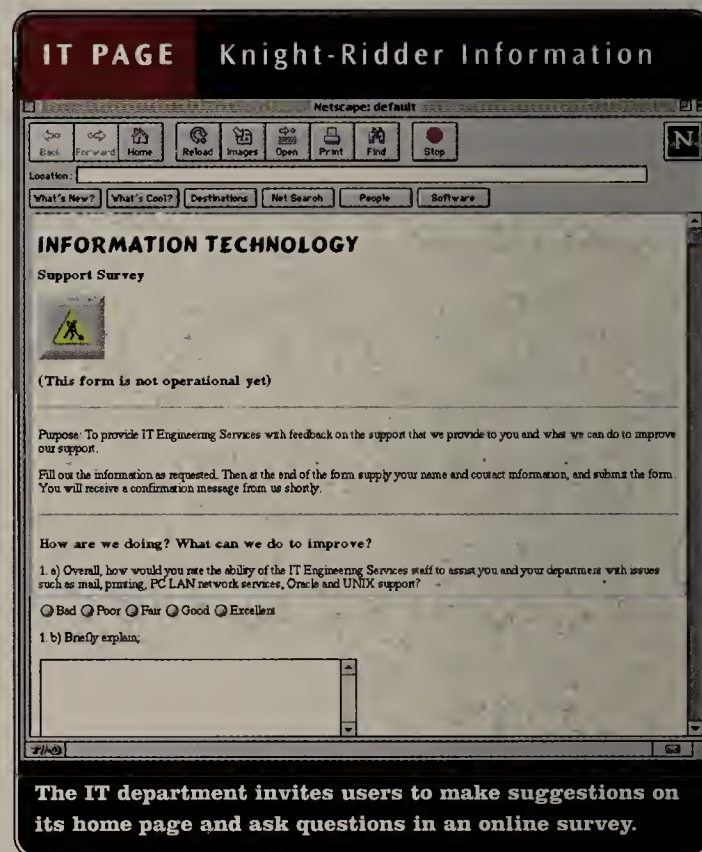
To make that customer information Web-accessible, IT first built a prototype Web site designed as an internal customer management tool, dubbed Excaliber. It runs on a Netscape Communications Corp. Communications Server, so users can access it with any browser.

Excaliber's home page has a selection of buttons that bring up customer information sorted by factors such as customer number, payment status or services ordered.

Clicking on a button on the Web page activates a Perl or bin script that retrieves customer information from the Oracle7 database where it resides. Users can view the information in tables or graphs, sorted as they choose.

A subset of Excaliber is the Roysys royalty-tracking system. Through the company's Web page, users can get information about Knight-Ridder Information's contracts with database providers. That information helps employees balance usage and cost, and having it easily available may help Knight-Ridder Information negotiate better contracts the next time around, Shipley says.

Before Excaliber, an employee seeking such data had to ask an IT staffer to ferret the information from the Oracle database and run a report. Shipley



tee of about a dozen members. They are sharing ideas about what to build next, and drawing up some design concepts. The committee also is gathering user comments on the beta version for an ongoing progress report it passes out to Knight-Ridder Information officers.

One big future enhancement will be to link in remote employees. Shipley and some selected users can access the intranet from outside via designated Internet service provider nodes, but he wants to devise a way for remote offices and traveling employees to dial in — securely — via the Internet.

If the intranet becomes a permanent and maturing part of the Knight-Ridder Information network, Shipley wants to give customers access, with appropriate security, of course. For example, a customer would be able to retrieve account information, leave requests for changes in their service and make support queries online.

But for the moment, Shipley just wants everybody at Knight-Ridder Information to wield Excaliber and tell him what they think. ☺

Amaze your customers

*Put account
and order data
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their very eyes.*



RADEE LADDEN

BY JIM STERN

After a wild, wacky, wonderful honeymoon with the Internet, the folks in marketing are waking up to the fact that this intranet thing may be just as profound.

Marketing executives are realizing they can leverage the intranet to further their goals of getting the word out, hauling in prospective customers and keeping tabs on the changing marketplace.

Just like others in your company who need to send and receive information (that's everybody, by

It's time to cross the line. The winners of tomorrow will offer their customers access to applications and databases previously considered "Internal Use Only." They will open the doors to the Communication Zone.

the way), the good people in marketing need to keep informed and disseminate information throughout the organization.

If the new product launch is to go off without a hitch, then the price sheets, trade show schedules, positioning papers, production schedules, competitive analysis and press releases need to be drafted, reviewed, approved and then distributed at once and to many. Companies usually call this process workflow.

Competitive information also needs to fly when

corporate competitors launch their products.

Online discussions about product plans shrink time to market for Microsoft Corp. Interactive calendars on the company network smooth scheduling at Sun Microsystems, Inc. Are you that wired yet?

John McCracken, chief executive officer at Silicon Graphics, Inc., boasts that his company can have a videotaped rundown on a competitor's product on the SGI intranet within 24 hours of the announcement. Are you that competitive yet?

These are the powers of an internal communications system that are rapidly becoming part of the way America does business.

The network is the computer?

Forget it. The network is the company. We're going toward mass publication and serious online workflow. That's good. But your customers want direct access, as well, and your marketing department can achieve its goals faster if the line between the external Web site and the intranet becomes less of a line and more of a zone — call it the Communication Zone.

Invite your customers to dinner

Face it, customers will take whatever you can give them, and in two days, they'll be back for more.

Customers are the ravening hordes. They are the angry mob. Asking them what they want is like asking a six year old how much ice cream he wants. It seems obvious there is a limit to the amount of ice cream available, but a limit to how much he wants? Unthinkable.

Today's marketplace offers goods delivered from one end of the nation to the other overnight, overseas in a day and a half, and custom-made suits before dinner.

Keeping your customers no longer rests in their willingness to stay with you out of blind loyalty or through inertia. Consumers and business buyers are becoming more and more sophisticated and getting used to better and better service. People are expecting greater access to product information.

Fine, you're already publishing product details on your World-Wide Web site. They also want access to problem resolution. Fine, you have a knowledge base of product issues they can query. They also want access to the process of doing business. Your customers want to participate in decision making.

If your external Web site is up to snuff, you have the in-depth information in place already. But now it's time to cross the line. The winners of tomorrow will offer their customers access to applications and

See Amaze, page 40

Amaze, continued from page 39
databases previously considered
"Internal Use Only." They will open the
doors to the Communication Zone.

You know that great problem-report-
ing database you've been building?
The one your customer service reps
tap into to answer questions over the
phone? It's time to clean it up and
invite your customers to help create it.

Intersolv, Inc. (www.intersolv.com), a
software development tools company,
lets anybody who is interested review
questions its customers have about
using its products. It's a gutsy move.

Says Beth Martinko, director of
North American customer support at
Intersolv, "Even though this is an area
ripe for abuse by competitors, we felt it
was better to be forthcoming than to

sweep the dirt under the carpet. If
users can look up problems and get
the answers faster, and we can give the
answers cheaper, it becomes a no-
brainer."

Before Intersolv competitors rush
over to view the 100,000-plus docu-
ments, Martinko is quick to point out
the company has a password-protected
area for customers who have pur-

chased support. Those who have are
given access to Intersolv's problem-re-
porting system. Customers enter trou-
ble tickets and follow their progress
through the problem-solving process.
Is this an Internet application or an
intranet application? The line is blur-
ring.

Where's my order?

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mation about them in computers. They
know that you are migrating this data to

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12/5/96	Atlanta, GA	12/6/96
12/10/96	San Francisco, CA	12/11/96
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Q&A

A sense of déjà vu

The brave new world of intranets raises a sense of déjà vu in Rich Tong. Client/server technology was going to change the face of corporate America a few years back, and Tong was part of the Microsoft Corp. team shaping and promoting the early Windows NT solutions that were among the company's early enterprise endeavors. Today, Microsoft mixes in Web technology, but Tong says the stock is the same: Windows NT. And he finds the Internet and intranet markets more tangible and promising than the often nebulous client/server architecture. Tong, who is now vice president of

Microsoft did a very public about-face on its development plans for the Internet last December. Was there a similar internal realization regarding intranets, or did you devise that strategy at about the same time?

I think the Internet stuff was a little bit different. Intranets, which people sometimes call corporate LANs, have been something we've been focused on for a long time. What we did, though, was focus on applications. We realized Internet technology could be used both externally and internally. But that requires you integrate a lot with existing technology and existing applications, as well. The Internet is all brand new stuff — it's all green field. With intranets, the situation is quite different, and it's much more of a challenge. And that's where a lot of our customers are looking to us to provide answers.

No. 1, integration is about Windows, on both the desktop and the server. Over the course of the next year, we'll be working to get to that next level of ease of use. Then, to integrate these Internet networking technologies, using the standard protocols, and provide easy development for client/server applications. And the

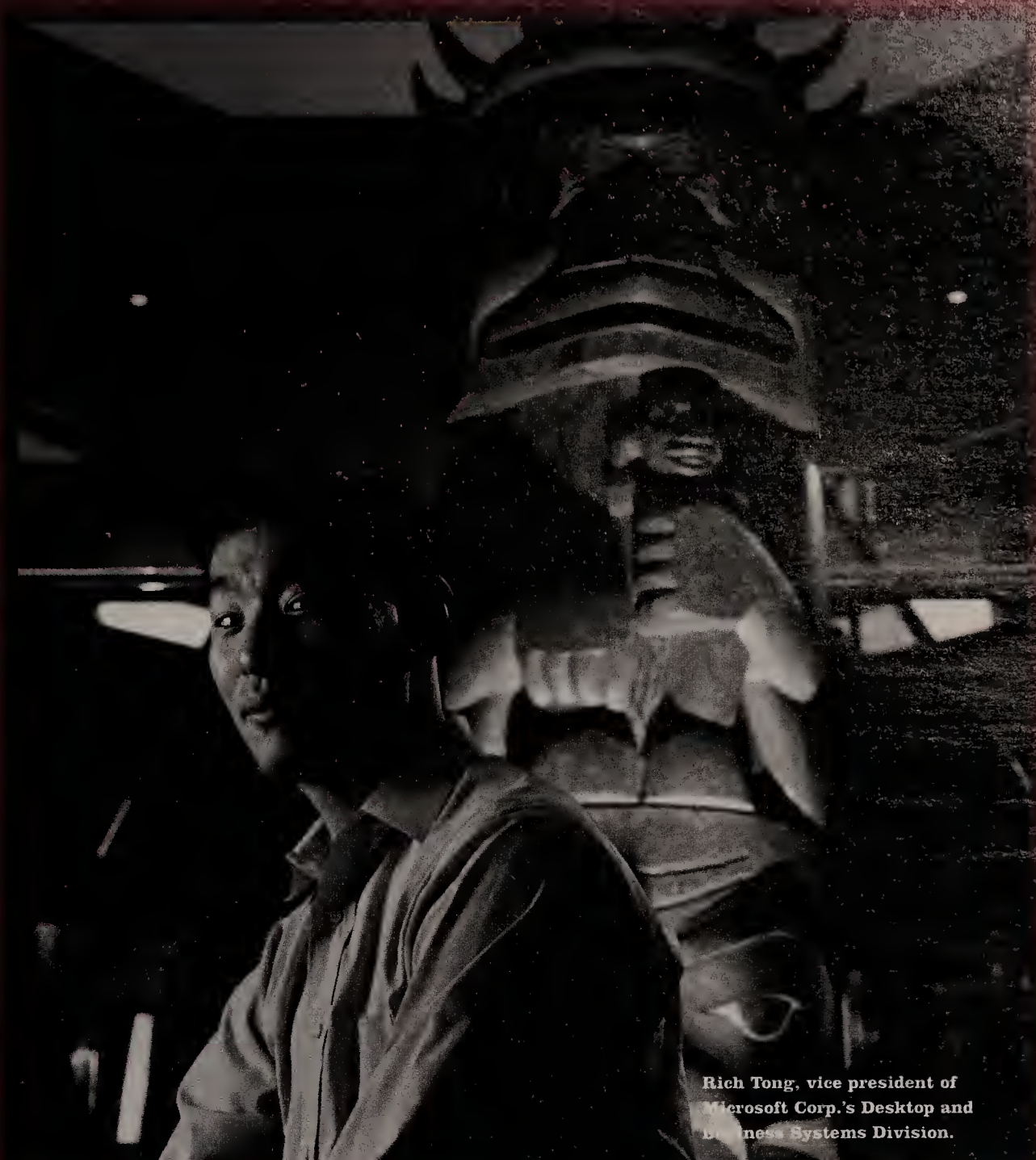
third leg has to do with interoperability with existing systems, transactions, replication management.

What intranet-specific development is Microsoft doing in those areas?

We've spent a lot of energy on ease of use. We believe that the systems we think today are easy to use in about five to 10 years will be viewed as very quaint because the number of features, functions and things we'll have added is going to be just amazing. Therefore, we have to push harder on ease of use.

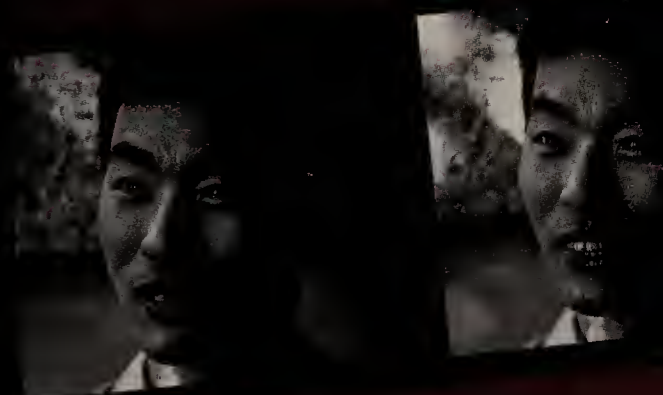
We have a project, code-named Viper, that will allow you to access CICS, Sequel, Oracle — all married together as though one system. The enterprise technologies we work on are much more about heterogeneity and multiple systems than they have been. You'll see much more integration. Like the Active Desktop, where the idea is the browser and the operating system aren't separate but totally integrated. Now, to make an analogous thing happen on the Web server side, we have this notion of an Active Server. The Web server won't be separate from the server operating system; it's just going to be part of it. And very fundamentally, it's not just about serving Web pages. It's about applications that are connected together, and that's what Viper is as a project.

See Déjà vu, page 42



Rich Tong, vice president of Microsoft Corp.'s Desktop and Business Systems Division.

JEFF CORNWY



Microsoft's Desktop and Business Systems Division, recently shared his plans and visions with Senior Editor Peggy Watt.

they're at the top of the roller coaster looking down and, yes, the view is great but it's a bit scary. So, our

INTERVIEW

&

Déjà vu, continued from page 41

So Microsoft is wedding Web servers to Windows NT just as you are building the browser into the desktop operating system?

That's right. See, Web servers in their first generation were primarily about taking an HTML file and sending it to somebody. When we talk to our customers, they say, "Well, that's a small portion of what I want to do. In addition to doing that, I'd like to get to the point that I serve files but I can also run scripts, even if it's an order for something on the CICS system." That's Viper, and we should be seeing beta sometime this year.

And we have another project we're working at which is sometimes called a reliable message queue. Both these things are very important Internet and integrating technologies.

Many corporations have existing, disparate Web servers that pop up later strung together. How accommodating is Microsoft's enterprise view, especially since you're bundling your Web server with the Windows network operating system?

Well, there are two levels of integration. The first level is just for serving raw Web pages, right? And at that level, there's great interoperability.

The harder thing is when you have an Active Server. What do you do if you had, say, a Netscape server that wants to plug in to this whole system? And so there we are going to ask [Netscape Communications Corp.] to change a little bit and support OLE. So you can treat that other server as an object. Long term, this is more valuable. In fact, the way our transactions coordinator works is it thinks it's talking to a lot of OLE objects. So it treats the SQL Server and the Oracle system and the CICS system like OLE objects.

I certainly hope that when customers look at us, they see we have a very comprehensive product line, but also very easy-to-integrate other components.

So how have intranets penetrated Microsoft? Does nearly every Microsoft employee have a Web server or at least a home page?

I wouldn't say nearly everybody, but it's getting to be very high. Basically, now people are embarrassed when they don't have one. I've had a Web server for my workgroup for more than a year now.

Do you find intranets are an easy sell?

I think it's almost the same bleeding-edge group of IS people who just go to the next thing. And I think all of them have leaped. The question is, 'How do we persuade the rest, the 80%, that this is the right approach?'

Well, in some ways, this is a continuation of LANs. There was client/server and now this, so we're making everything better gradually, and we have to convince them. It's got a lot of the things they ask for. You know, five or six years ago, you would be very hard pressed to find any company that would say, 'Hey, we got it to do all these things simultaneously.' And I think that's just the thing that we were missing in this industry: a comprehensive approach.

What are the other main points you think convince people to deploy intranets?

Ease of administration, integration, development, the writing of applications and integration of old ones. Not everyone is going to rewrite all their accounting applications in Java. We want to be part of that Java wave, and yet, at the same time, we take the enterprise point of view and say it's one of the languages you'll be supporting.

Another point is the approach we take to the end-user experience. You know, today everyone says Web browsers are easy and all that other stuff. But the fact is you have to learn some new stuff to use them. We want to make it even easier.

All the good ideas in the browsers will appear in the apps and in the operating system. And similarly, all the good ideas in the apps and in the operating system will appear in the browser.

Where does Java fit into this model of object orientation?

Well, first of all, when I say Active Scripting, part of the Active Desktop, this actually includes either Java, JavaScript or Visual Basic. Basically, there are two different types of things to do. Scripting is really gluing things together. And so our Active Scripting technology largely is language-independent — you just plug it in. And the other place is where one of the objects is the transactions coordinator, and it actually talks to Java.

This leads back to the question about components. Is Microsoft planning to sup-

ply all or most of the components of an intranet for a corporation?

Well, "all" is a big word. I certainly hope customers see we have a very comprehensive product line, No. 1. No. 2, I hope they see that that product line is very integrated, and that the products work together very well. And No. 3, in terms of integrating other components, it's very easy to do that.

And when will we see a proxy server as part of that selection?

As for the proxy server, that product should ship this year.



And like all the products in our Back Office product line, the product is going to use NT security. So when you want to go out [of the intranet], it will be checking against the NT database for permissions and access rights. Those are the kinds of things customers are telling us offer huge benefits in integration. And it also means all the Windows NT management tools work. You can monitor, you can audit, you can track and so forth, with the familiar Back Office tools.

Bill Gates says Microsoft expects the intranet market to be much larger than the Internet market. Can you elaborate?

This is because collaboration and coordination is incredibly important inside corporations. People are willing to spend an amazing amount of money to make accessing information very easy, make collaboration seamless and to make the management of all the information in the company simple. And this is all driven by Internet technology, which is a standardization of protocols.

Although the intranet and Internet use the same technology, how do you contrast the markets?

I'll use a nautical example. The Internet is a sea change. It's as important as WYSIWYG and the graphical user interface. That was a new phase and a change and basically a common way to access applications.

I think that part of the reason that I'm very excited about the Internet technologies is, in essence, in the intranet it makes quickly what used to be a revolutionary change, like in the way you structure your applications from CICS, COBOL, to client/server.

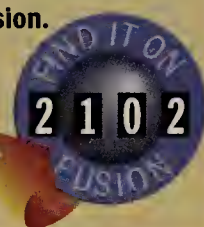
There's a very, very strong déjà vu with intranets and client/server.

If you were to give this a product name, it'd be called Client/Server 3.0. Where LANs were the first venture, then we finally understood the need for Visual Basic and the development process and all that, and then to application servers. And now we understand this. ☐

TONG ONLINE

For the full text of this Q&A, go to Network World Fusion.

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GIACOMO MARCHESI

The LEGACY TANGO

BY DANIEL DERN

Teaching your intranet to dance with the old standbys.

If mainframes are stodgy, dyed-in-the-wool and typically pinstriped, intranets are best thought of as chatty, irrepressible and anxious to get things done.

Sooner or later, though, you are going to want to get these two to tango. After all, those legacy systems house rich resources that will ultimately prove valuable to intranet surfers.

MIS groups exploring the question of how to bridge the environments often find new, valuable uses for legacy resources and quicker, more effective ways to bring up new legacy-based applications.

It is no longer a question of whether you can make legacy systems available to Web browser users, it is simply a question of which tools to use. With the range of options available today, it is possible to make any legacy system browser-accessible.

Screen test

The first and simplest way to give browser users access to legacy systems are screen scrapers — programs that enable a Web browser to emulate terminals of legacy environments, directly or through a Web server.

Programs that do this include I/Net, Inc.'s (www.inetmi.com) Webulator/400, a 5450 terminal emulator that converts AS/400 application screens to HTML, and IBM's CICS-WWW gateway.

Using a program such as Webulator/400, users can access legacy information and applications such as accounts receivable, inventory and order status, written in languages such as COBOL, ILEC, RPG, DDS and C.

Screen scrapers are simple but sometimes inadequate. The translator may not emulate screen elements such as tables properly and may not be sufficiently secure.

Instead of enabling browsers to talk directly to legacy systems, the next option is to use a Web server intermediary. Here, you have two options, says Rob Rowe, executive vice president of consulting services at BR Blackmar & Associates in Dallas. You could turn the existing server into a Web server or connect it to a separate intranet Web server, such as a box running Unix or Windows NT.

"You can turn any box into a Web server," says Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "HP, IBM, Digital — they all have service offerings to assist customers in implementing Web servers on their equipment."

Web server offerings for legacy users include: IBM's OS/390 Internet BonusPak for MVS and OS/390 users; Webshare, a freeware server for VM systems (see IBM's VM home page at [http://](http://vmdev.gpl.ibm.com)

vmdev.gpl.ibm.com for examples of VM-based Web servers); and I/Net's WebServer/400 and its new Secure Commerce WebServer.

In addition, freeware and shareware HTTP Web server programs written in C or PERL can be obtained and recompiled on your legacy platform, or you can even write your own Web server program.

Using a program like Webulator/400 users can access legacy information and applications such as accounts receivable, inventory and order status.

Many organizations have elected to install and run Web servers directly on their legacy systems. Stephen Wallace, president of Pacific Brokerage Services in Los Angeles, passed on that option at first. "We had a single-processor AS/400 but didn't consider using it as our Web server," he says. Wallace spent \$3,000 for a PC running Windows NT and also purchased a copy of Netscape Communications Corp.'s Commerce Server.

But, while looking for other information on the Internet, he ran into I/Net's site. "We ended up buying their Web server, and it took us about two hours to install on our AS/400. We're providing dynamic content using RPG and C. We're getting about 40,000 to 50,000 hits daily from our customers, and each gets a unique response," he says.

See Legacy, page 44

Legacy, continued from page 43

Wallace is happy with the results. "It's fast, and we never have any downtime. We do have security concerns, which we expect I/Net's new commerce server will handle," Wallace says.

Right place

Although Web server software is available to convert most of today's legacy hardware into Web servers, "it's important to evaluate whether that's the right approach," observes Michael Goulde, senior consultant at Patricia Seybold Group, Inc. in Boston. "Legacy systems are expensive. It's going to be a lot cheaper to add a PC-based server to handle the additional load rather than add another processor to the mainframe."

Zach Kessin, a contract Web developer, says the best Web server software runs on Unix, OS/2 and NT. "Running the Web server on a separate platform simplifies distributing the processing load and will make it easier to migrate the legacy system when and if you want to," he adds.

Adding Web serving to your legacy system is fairly costly according to Rowe. "It involves getting TCP/IP running, and most legacy-type servers aren't tuned for it, so you're creating about the most expensive possible Intranet server." Even IBM tends to front-end its AS/400s with RS/6000 Web servers, he notes.

"The widest range of Web development tools are available for PC environments," Goulde points out. "You'll have to write the queries that go from the Web server to the legacy system or implement the screen scrapers no matter where you put the actual Web server. With today's tools, any data I can get to via ODBC [Microsoft Corp.'s Open Database Connectivity architecture] I can access equally well from a Web server."

Using a separate system for the Web server offers other advantages, Rowe says. "All the HTML, security, firewall and other intranet/Internet functions are on the Web server. This isolates the functionality, letting each server do what it does best. It's also more manageable and provides better security — you've got a dedicated server for the intranet activity, and the legacy server is only handling data."

"Plus, most of today's Web management, testing and administration tools run on NT or Unix, not in legacy environments, which means that products — and staff — are more expensive if a company chooses to work within its legacy framework," Rowe says.

From the security perspective, Goulde adds, "Frankly, I'd be concerned about having [Common Gateway Interface] scripts running on the same machine where my legacy data was stored. Bad CGI programming can destroy data and even directories."

"Legacy systems tend to be corporate assets, and most corporations don't understand security well enough to be 100% sure they're keeping unwanted users from stealing or corrupting data," Rowe says. "Within our test group, with only a basic knowledge of IP, Unix and NT, we find we're able to break into about 90% of systems we test. None of our customers are willing to take that kind of risk by making their information available via intranet or Internet access."

Webbing legacy apps

Whether your new Web server is on the legacy system or not, the task of getting the two to talk together still remains.

This means using CGI scripts or other tools to turn browser input into queries to legacy systems and

inserting HTML formatting codes into query results, turning them into Web pages for delivery to browsers.

In theory, CGI scripts can be created "by hand" — that is, handwriting the code — or taken/modified from online and CD-ROM libraries. However, in practice, this is not likely to be sufficient for building scripts to access legacy systems.

But relatively inexpensive scripting tools such as BlueStone Inc.'s Sapphire/Web and Information Builders, Inc.'s PowerBuilder can be used as front ends, providing a way to create HTML pages and CGI-bin scripts to work with legacy applications and popular databases from companies such as Oracle Corp., Sybase, Inc. and Informix Software, Inc.

One advantage of this approach is that the Web-based applications can access any number of Web, database and legacy systems.

At the high end are the more sophisticated application development environments such as: WebObjects from NeXT Software, Inc. in Redwood City, Calif. (www.next.com), which is used by companies such as Dell Computer Corp., Sharper Image Corp., Fannie Mae, Merrill Lynch & Company, Inc. and Motorola, Inc.; Visual Wave from ParcPlace Digital in Sunnyvale, Calif. (www.parcplace.com), whose users include Dun & Bradstreet, Federal Express Corp. and other Fortune 1000 and Global 2000 companies in the financial, health care and public utility sectors; and IBM's Visual Age.

The applications created using these tools, which can run on separate servers, sit between users' Web browsers and servers on the corporate network, be they legacy systems, Web servers or anything else ranging from Internet services to real-time data feeds.

These tools offer fast application development and typically can talk to a wide range of back-end systems and other existing application environments through APIs, including the Internet Server API (ISAPI), the Netscape Server API (NSAPI), and Web programming interfaces such as CGI.

Dell's new online purchasing system, for example, which lets Dell sales staff as well as Web users configure and price a purchase, was done using NeXT's WebObjects. "All the data was already in a relational database," says John Landwehr, product marketing manager for WebObjects at NeXT. "WebObjects provides the interface between the user interface and the database queries/responses."

WebObjects also simplified and sped development of an intranet/legacy application at Sharper Image, Landwehr claims. "All the data was already in their database. Using WebObjects, Sharper Image's staff was able to crank out three online applications, including the 'Catalog Showroom,' and a custom gift

WHO ISN'T DANCING?

Information about corporate plans to integrate intranet and legacy environments is scarce, but you can extrapolate conclusions from some Internet data.

A 1995 survey of 189 companies by International Data Corp. called "Behind the firewall: A look inside the corporate internet" found that **61%** of the companies had linked internal systems to the Internet. Of those, **68%** said they were providing access to databases, **54%** said they were providing application access, and **41%** said they were processing transactions.

The survey revealed that **71%** of the companies planned to connect internal systems to the Internet this year. Given the technologies to connect these systems to an intranet, it isn't too much of a reach to conclude that a similar percentage of companies are already integrating intranet/legacy environments today.

finder catalog," he says. The latter creates a custom selection from the catalog based on user keywords to help customers pick a gift from the relevant subset of Sharper Image's total offerings.

"Instead of building HTML by hand, they created WebObjects applications that did queries and returned the results as on-the-fly HTML pages. They were able to reuse much of the program components, which means things got done much faster and less

expensively," Landwehr says.

"In a large company, the business isn't being run by just one data source, so you need applications that can tie it all together. Putting a Web server on each piece won't do it."

Kelly Looney, product marketing manager for Visual Wave at ParcPlace DigiTalk, says the Visual Wave product offers an object-oriented development environment through which Web

browsers and Web servers can connect to systems with "front-line business responsibilities."

This means providing the ability to interface to a range of platforms, databases and environments, such as DB2, Sybase, Oracle and Informix, as well as C-type interfaces, socket connections and systems from IBM, Tandem Computers, Inc. and other vendors. "Visual Wave lets MIS treat Web browsers and servers as just another platform in terms of the types of clients and servers they're handling," Looney says.

Strategy reflects requirements

It is clear that one way or another any application on any legacy platform can be made accessible to Web browsers. The choice of solution depends on the usual factors.

"You need to know what you want to do," Dzubeck says. "You want to match your capacity to the demand you expect."

"It's the content that's important, not the platform," he says. "Nowadays, you can put a Web server onto any system that has content, which is important. Don't re-port content. If you have an investment in equipment, knowledgeable people serving it, etc., don't port that to something new. But if the platform the content resides on can't accommodate the new demands, then move it."

Don't forget to keep the future in mind, adds NeXT's Landwehr. "Because of the tremendous rate of change — technology for the Web has undergone 50% change within the past six months alone — when you commit to any one technology, you need to know how portable it will be and how will it grow. For example, HTML keeps changing, so you need a technology that can change with it, such as adding support for frames. Pick tools that will keep up with Web technology for you." ☺

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*With today's tools,
any data I can get
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Web server.*

—Michael Goulde,
senior consultant at
Patricia Seybold Group

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JOEL NAKAMURA

*When you
start to feel
that way, the
time has
come to
reassess your
defenses.*

BY BETH SCHULTZ

Certain it had established adequate intranet security mechanisms, a manufacturing company recently asked a team of information protection consultants at WheelGroup Corp. to act like disgruntled employees. It wanted to be doubly sure users with valid accounts could not access restricted servers.

Within minutes of receiving a user name and password, the security team had bypassed the security controls, broken into the engineering department's server and downloaded a blueprint for a next-generation product the client had spent \$2 million developing.

The client wasn't phased, says Toney Jennings, president of WheelGroup. The IT manager thought the technology-savvy engineers had simply left a trap door open when customizing the server. "You'll never get into accounting," he said.

A few minutes later he watched in horror as the WheelGroup team downloaded a performance report and the salary history of a company vice president.

Scenarios like this are by no means restricted to internal security breaches. Jennings tells of another client who asked WheelGroup to try penetrating the intranet security barrier it placed on its Internet connection.

"IT did a great job of securing that one Internet connection," Jennings says. "But it didn't realize that marketing and other groups had gotten their own connections — 14 in all!" From its operations center in San Antonio, Texas, WheelGroup infiltrated the intranet and downloaded strategic plans and product designs.

"We usually find that company computers are so darn open, breaking in is as easy as putting a hot knife through butter," Jennings says.

Other security experts agree, and they worry that intranets will exacerbate the situation. It's hard enough to secure computers known to be attached to a corporate network; what happens when a dozen or so Web servers have been put up without IT's knowledge?

The implications associated with the deployment of unsanctioned Web servers are significant, says Gregg Deane, senior manager of Ernst & Young LLP's Lake Michigan Information Security Services practice based in Chicago. "That PC turned server is often attached to the wide-area network but not physically segregated. It's a potential entry point to sensitive corporate information."

Unofficial, and so unprotected, Web servers are among the most obvious security risks associated with intranets. But even sanctioned, IT-installed servers and other intranet-related hardware and software can introduce vulnerabilities.

"IT managers might inadvertently leave loopholes open when they set up a firewall's routing table or when they make applications HTML-aware or when they set up the [Secure Sockets Layer] on the servers," says Richard Kosinski, president of NeTegrity, Inc., a security firm in Waltham, Mass.

It's ironic that firewalls, the very devices meant to secure internal Webs, often prove vulnerable. This happens because IT managers make so many access allowances that the brick walls end up looking more like Swiss cheese, Jennings says.

Such was the case at another WheelGroup client — a Fortune 500 company that asked the firm to test if the firewall was enforcing the policy it was supposed to be.

"In this case, the firewall was letting in everything. It was not filtering any traffic," Jennings says. "People got to mucking around with the firewall so much that it basically turned out to be just a workstation acting as a router."

This scenario is all too common, says Stephen Cobb, director of special projects at the National Computer Security Association (NCSA).

If 5,000 browser-enabled employees decide they need to be able to run audio clips off the Internet, Cobb says, they can pressure IT to open a port on the firewall. IT, however, may not have had a chance to thoroughly test the audio application for security weaknesses.

"There's direct pressure to liberalize the firewall for technology before that technology has really been tested," Cobb explains.

When it comes to intranets, firewalls are the staple security technology — hence, many companies define an intranet as the portion of their network behind a firewall. That view may be rather limited and simplistic, but it points out

SECURITY OUTTAKES

Information protection specialists agree a heightened sense of security awareness has accompanied the dramatic growth of intranets and the Internet but feel there's plenty of room for improvement. Here's what a few experts say about the state of information security today.



"A lot of companies still have a lot to learn about data, PC and LAN security before they move on to scarier stuff like intranets."

Stephen Cobb, director of special projects
at the National Computer Security
Association in Carlisle, Pa.



"Information security can be greatly improved. There's a pretty wide gap between the risks most American corporations have within their networks and the measures they've deployed and are using to reduce those risks."

—Richard Kosinski, president of NeTegrity, Inc.,
a security firm in Waltham, Mass.



"Security today is more reactive than proactive. Technologies, like Web servers and browsers, are being deployed in many places faster than the ability of the infrastructure to keep up."

—Gregg Deane, senior manager at Ernst & Young LLP's
Lake Michigan Information Security Services
practice in Chicago.



the trust companies place in the technology.

"The technology du jour in intranet security is the firewall," says William Ruh, executive vice president of Concept Five Technologies, an intranet and electronic commerce consultancy in McLean, Va.

Cordoning off Web servers

Intranet builders install firewalls on the corporate Web's perimeter and limit entry to remote clients with appropriate names and passwords.

Firewalls are available with a range of capabilities from a variety of vendors, including Digital Equipment Corp. and IBM as well as smaller players such as

See Security, page 48

Security, *continued from page 47*
 CheckPoint Software Technologies, Ltd., Milkyway Networks Corp. and ON Technology Corp.

First-generation firewalls, also known as packet-filter routers, simply examine the source and destination addresses of inbound TCP/IP packets. They check the packets against a list of "friendly" addresses, and allow or reject entry to the network as appropriate.

These firewalls act more as a deterrent than a security stronghold. Hackers can easily substitute friendly addresses — a process called spoofing — and gain access to the intranet.

Second-generation firewalls, commonly known as proxy servers, are meant to address that problem. Proxy servers capable of filtering packets at the application level are particularly important for securing intranets.

As a proxy for a Web server, these application-layer firewalls have the authority to communicate with the system requesting access. Besides verifying the validity of user names and passwords, these products examine the data being transmitted, not just the packet header. An HTML proxy, for instance, knows what valid HTML data looks like and can determine if access should be provided.

Vendors such as CheckPoint and ON Technology have developed third-generation firewalls that use the Stateful Multi-Layer Technique (SMLT) for screening packets. Rather than examining packets using a proxy, SMLT-based firewalls use data-parsing software that takes a snapshot of the entire packet. These firewalls quickly compare packets to known states of friendly packets, a technique that saves on the processing time that can bog down proxy-server firewalls.

Increasingly, IT managers are using firewalls like these to cordon off corners of intranets. "A lot of companies

would prefer to not have human resources or key accounting functions visible to everyone in the company," says Jay Batson, vice president of ON Technology in Cambridge, Mass. Firewalls provide the answer.

"The ability to segment systems is one capability any information security person should have in his bag of tricks," says Concept Five's Ruh.

J.P. Morgan & Co., Inc., thinks so, too. At the New York-based global financial services firm, an information security services team helps business managers assess risk issues associated with data they want to put on the internal Web. If the information is meant for the eyes of only a portion of the company population, the security team might recommend the information be hosted on a private Web rather than the corporate intranet, says Fred Pinto, director of information security services at J.P. Morgan/The Pinnacle Alliance.

"We'll use the firewall to segment the Web server," Pinto explains.

Whether you're buying a firewall to restrict external access or segment an intranet, make sure it's one that you can understand and configure, ON Technology's Batson recommends. "The No. 1 problem with firewalls is misconfiguration, so make sure you buy one that's drop-dead simple for what you have to do," he says.

The NCSA, a multitiered information security group in Carlisle, Pa., encourages companies to frequently test their network firewalls to make sure there are no vulnerabilities.

"Firewall technology is very good, but it is hard to configure. If a firewall is installed incorrectly or is imperfectly managed, then some of the holes meant to be plugged aren't going to be," says the NCSA's Cobb. Hackers can exploit four or five bugs in the Unix Sendmail program alone if a firewall isn't properly configured, he adds.

Test and test again

Intranet administrators can use outsiders to test their firewalls or do it themselves using commercial software from vendors such as Internet Security Systems (ISS).

ISS recently enhanced its line of security assessment tools with intranet-specific products: the Web Security Scanner, which runs vulnerability checks of the operating system running beneath a Web server; the Firewall Scanner, which tests the configurations of firewall applications and the operating system on which the firewall runs; and the Intranet Scanner, which scans every device on an intranet and reports back with a list of services running on each machine and a prioritized list of security vulnerabilities.

"We find, on average, 18 high-risk vulnerabilities per network device, including printers, routers, firewalls and Unix boxes," says Tom Noonan, president of Atlanta-based ISS. "This is a huge problem: Large companies can have tens of thousands of such devices on an intranet."

Because intranets run TCP/IP, they can be more difficult to secure than other corporate networks, Noonan contends. "The open communications and ease of sharing information supported by TCP/IP is directly counter to security and minimizing access to the intranet," Noonan says. "The two are at

opposite ends of the spectrum, which is what makes security on the intranet so difficult."

Lockheed Martin Corp. appreciates that truism. The challenge of building an intranet and providing ubiquitous access to information has required the company to shift from the mainframe

mindset of protecting everything to the open Unix philosophy. That's hard for a company working in the defense industry, says Lynda McGhie, manager of information security at Lockheed's Enterprise Information Systems division in Orlando, Fla.

McGhie compares the move to an intranet environment to letting the chicks out of the henhouse. "You lose control and accountability."

So when it comes to security, she says, "we use everything you can imagine." To protect the data allowed on its intranet, Lockheed uses secure Web servers, public and private keys,

smart cards, encryption, and internal and external firewalls.

The company will soon add encrypted tunneling to the mix, which allows remote connectivity to the intranet over a secure Internet link.

The company does not allow the use of JavaScript on the intranet because of security problems found in the programming language, McGhie says. "We don't need Java today, but we will soon, so we're hoping that vendors cooperate,

See Security, page 50



"We usually find that company computers are so darn open, breaking in is as easy as putting a hot knife through butter."

—Toney Jennings,
 president of WheelGroup Corp.,
 a security consulting firm in San Antonio, Texas.

OF SECURITY POLICIES AND INTRANETS

If you aren't ready to write and enforce Web-specific security policies, then you're not ready to roll out an intranet, or so says Stephen Cobb, director of special projects at the National Computer Security Association (NCSA).

"I'm a big believer in security policies. Unless you have a policy in place, you're dead in the water," says Cobb, adding that a formal policy shows a company has thought through security issues and is ready to address them as they arise.

Even if a company already has a security policy in place, it more than likely will need to revamp it to accommodate the intranet and the wide-scale connectivity it enables, Cobb maintains.

"We changed our security policy because of

the intranet and the impact of the open and distributed nature of the network," says Lynda McGhie, manager of information security at Lockheed Martin Corp.'s Enterprise Information Systems division in Orlando, Fla.



In its security policy, Lockheed defines categories of data and provides guidelines for protecting the information, McGhie says.

Chicago-based Amoco Corp. supplements its information security policy with new procedures and guidelines each time a new technology comes along, says David Burns, senior staff security analyst at the petrochemical company. For the intranet, Amoco established an oversight committee that keeps its eye out for information that shouldn't be available to everyone in the company.

"In the rush to develop the intranet and the information sharing that's implicit there, sometimes people go a bit overboard. So we've established some checks and balances," Burns says. "The charter of the group is to grow the intranet in a rational manner."

The NCSA's Cobb has a few recommendations for what an intranet security policy should include. Employees posting information on the intranet, for example, should understand they are responsible for checking the information to make sure it doesn't contain malicious code, applets or viruses. In addition, employees need to know they will be held accountable if they publish — purposefully or not — confidential information on the Web.

"Companies have to make sure that the reasons for policies are clearly stated: Information is vital to the survival of the company and, consequently, your job," Cobb says.

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Security, continued from page 48
plug the holes and make the environment secure in a timely fashion."

Amoco Corp. has made a similar decision. "We currently are blocking the importation of Java applets to the

The NCSA's Cobb points to potential dangers related to the caching of data by Web browsers. The typical browser caches 5M to 10M bytes of the most recently accessed data on the computer's hard drive. Microsoft

ble. Anker Berg-Sonne, chief technology officer and vice president of engineering for WebMate Technologies, Inc., points to what he considers major shortcomings of the standard HTTP-Secure (HTTP-S) authentication and access control scheme used by Web servers. To end an authenticated sessions, users must shut down the browser — something not routinely done.

Since there's no easy way to log out, people leave sessions open. Their user names and passwords, plus all the associated privileges, get attached to a session and communicated with each request from the point of logon, Berg-Sonne explains.

WebMate, an Internet/intranet company based in Canton, Mass., addresses this problem in its WebMate/Foundation application development tool and server-based platform. With the Foundation product, intranet managers can specify different access requirements down to the record level in database tables. They also can write access control lists that protect data by user name/password, IP address, day of the week, time of the day, or custom schemes.

The access control lists essentially create a security hierarchy for the

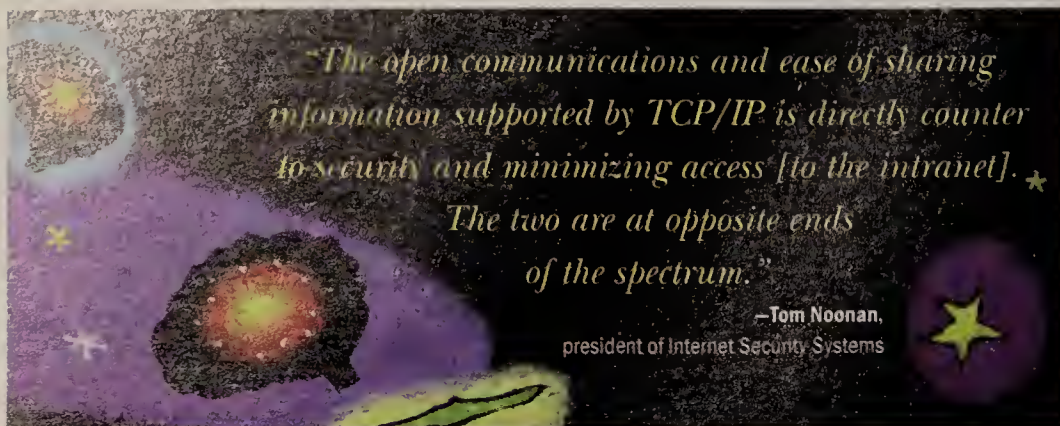
intranet. An intranet manager, for example, can decide from what IP addresses a database record can be accessed. "You can say that this data can only be accessed with browsers in this domain at this time of day. That means employees can't download data from home," Berg-Sonne says.

Piece by piece

Other security firms also are trying to granularize control over authorization. NeTegrity, for instance, earlier this October debuted the SiteMinder Enterprise Security Manager, which enables access control down to the most minute detail in an application.

With SiteMinder, intranet managers can apply access controls to applications, files, databases, records, fields, transactions, accounts, HTML resources and menus, NeTegrity's Kosinski says. What's more, administrators can centrally manage the rights to network resources.

"The idea is that customers end up with a system that will enable them to deploy intranets safely. They will know who the users are using anyone's authentication scheme and know down to the application and field level what they can access," Kosinski says.



intranet, but people can develop their own scripts," says David Burns, senior staff security analyst for the huge Chicago-based petrochemical concern company. "Importing a Java applet from an arbitrary site on the Web has the potential to introduce Trojan horse type of dangers," Burns says.

The Java weaknesses represent just one example of problems associated with emerging Web technologies, security experts say.

Corp.'s Internet Explorer, for example, reserves about 10% of the hard drive for the cache. On a 1G-byte drive, that's 100M bytes of potentially sensitive data waiting to be scooped up by an unscrupulous employee.

"You have to configure the server so pages aren't cached, not allow browsers to cache, or lock up the machines," Cobb says.

Even the so-called secure intranet technologies are potentially vulnera-

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TECHNOLOGY OPTIONS

So you've turned on your basic access scheme and set up your firewalls, but you realize some applications warrant additional security measures.

You have to ask, "How sensitive is the data?" And, "How much trouble is it worth to secure?"

Depending on your answers, one of the following technologies might fit the bill.

Digital certificates. This technology, also known as public-key certificates, can be used to identify users. Often compared to a driver's license, digital certificates typically contain identifiers such as the certificate owner's name and public key, the issuing organization's identification and digital signature, and the certificate's validity dates. They are based on the International Telecommunication Union's X.509 certificate standard.

Web servers can be configured to grant access only to people with certain certificates. Web browsers can be set up to trust servers that present particular certificates.

Encrypted tunneling. Tunneling software encrypts IP packets, encapsulates them within a TCP/IP packet and then forwards the scrambled data over the Internet. Tunneling software at the receiving end decrypts the data and forwards it to its destination within the intranet.

Face and finger images. For ultrasensitive information, a few companies have entered with products that use fingerprints and face images to grant access to information.

Public-key cryptography. A pair of public and private keys are used to encrypt and decrypt information (public keys are published, and private keys are kept secret). Information encrypted with one key, the public key, can only be deciphered using the matching private key.

Smart cards. These credit card-like devices, also referred to as token cards, generate and store key pairs and digital certificates.

Beyond access controls, WebMate provides an SQL extension that makes database access safer, too. "We think it's essential that the Web environment has one authentication system and the corporate relational database a completely different one," Berg-Sonne says.

With this product, users enter their basic name and password when accessing the intranet. Rather than duplicat-

ing that same authentication scheme, the Web application checks its database for user IDs and presents them to the relational database.

Intranet-specific user names and passwords never pass over the link between the Web server and the database, he says.

As the Java and HTTP-S problems illustrate, intranets introduce elements

of risk. But they also hold up the mirror to the generally poor state of network security, the NCSA's Cobb says.

The rise of intranets, particularly those that integrate with legacy systems, raise the bar on security, Cobb says. "Since the intranet leverages existing network technology, companies will finally have to face up to their security flaws." ☐

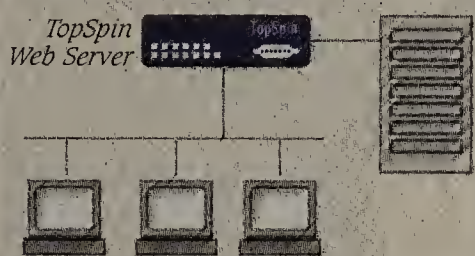
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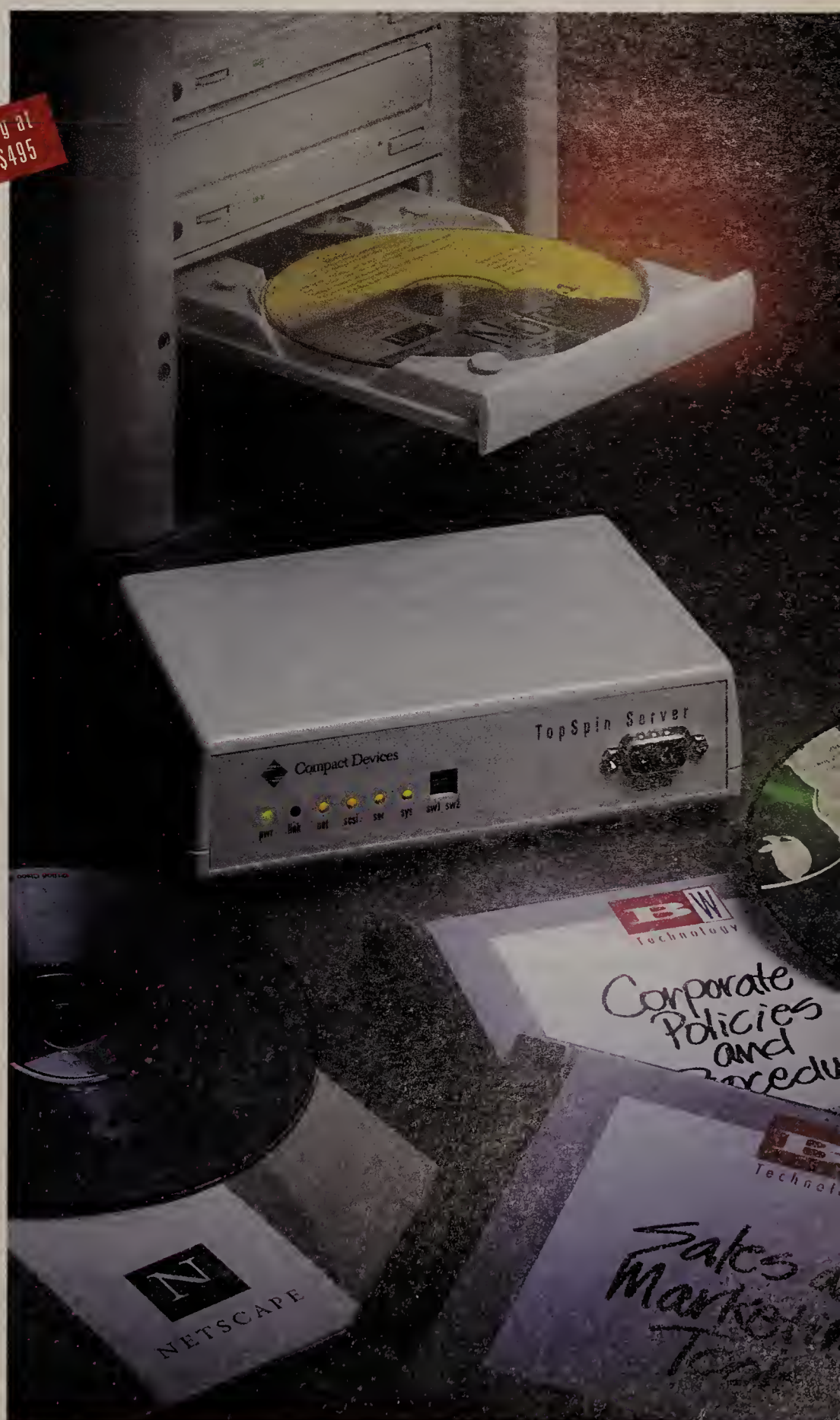
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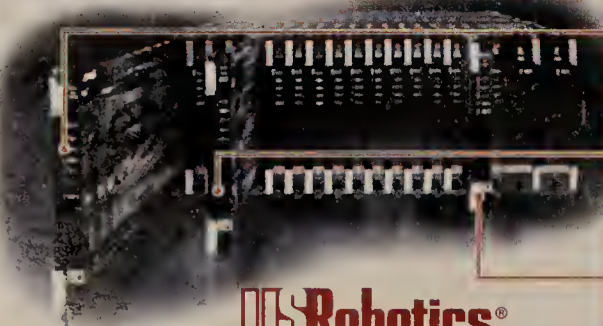
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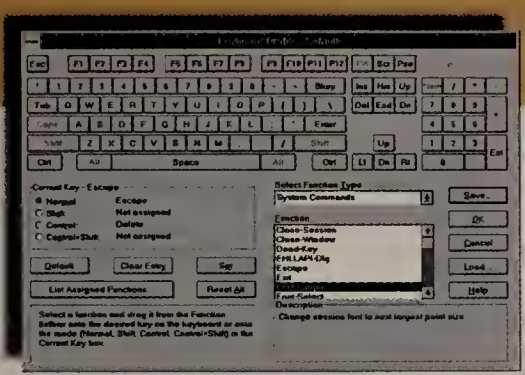
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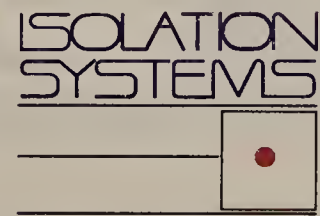
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Hip, Happenin' Cool Intranets

ool. You're hip, you're slick, and if it wasn't for an accident of fate that drove you toward the computer business, your hipness would be plastered all over fashion spreads in *GQ* or *Vanity Fair*. Right?

And when it comes to technology, you're so hip you're going to build an intranet. Excellent! Give me a virtual high five.

You've investigated Web servers, decided on your development tools and are ready to go. But before you really get started, I want to discuss two areas to ensure that you are, in reality, as cool as you think.

The first is looks. Not yours, you narcissistic devil, you. The looks of your intranet. You may be tempted to stay loose. You might think that you'll get the whole thing started and then add some gloss later.

Don't do it!

If you don't get a strong graphical style and some kind of document layout rules established early on, you sure won't be able to do so later. Oh, right, you could try to Genghis Khan-it: sweep down out of the IT group into the realms of barbarian departments and, with some persuasion from the torch and sword, make them tidy up their documents.

That might actually work if each department had, say, 100 or 200 documents. The problem is, if your intranet is the success you hope it will be, a department could easily have 1,000 or 2,000 documents in next to no time.

Let's see you make it tow the party line, then.

The first thing you need to do, my hip friend, is sort out graphics and design. As I've previously discussed in this space, you should be trying to create a new information publishing environment. Your goal should be to make it possible for staff members to capture, mine and use corporate intelligence through the intranet as fluidly and easily as possible.

Part of what will encourage intranet use will be its look and feel. If it looks like data — dry, techie and boring — users will probably not relate to it. On the other hand, if your intranet is slick, looks good, is well-organized and appeals to their idea of what's fun and easy to use, they'll care about it. Users will want to work with and add their own stuff to this amazingly cool environment.

As for the use of templates, be careful. For the top levels, by all means, create templates that are quite rigid. After all, this is where the tone is set. But as you move from corporate to individual publishing, relax the formats.

If staff members want to add a plain text file without any special formatting and without links to the rest of the intranet, let them — it will still be findable through your search engine. And if the doc-

ument turns out to be valuable, then you can migrate it to a higher, more corporate level. But using a hierarchy of templates achieves the objective of encouraging staff publishing.

So you've added gloss and pizzazz. You've got a way-cool look and feel to your intranet and staff use has exploded. More information is traveling around the network faster than ever before. Now, lest you want to get caught with your hip designer pants down, how's your security?

"Fine," you say? Well, if your security is fine, you're an exception. Based on polls taken of people attending my intranet education seminars, I estimate that somewhere between one in 70 and one in 100 organizations have what I would consider a security plan.

Sure, lots of organizations have bits of a security plan, but that's like being described as slightly

healthy — the truth is, you're actually mainly sick. So it is with partial or nonexistent intranet security plans: You really have a vulnerable intranet.

The security plan should detail how user accounts are set up and by whom, what resources are given to users as standard, what checks on resource use are made, how and when backups will be done and by whom, and the other millions of details of running an enterprise network.

One of the most important parts of the plan is collecting the data from logs generated by devices and processes (see story, page 46).

For example, you have firewalls. (You do use firewalls, don't you? You don't! We need to talk about this.)

Firewalls generate log files, but unless you examine these logs regularly, you have no idea what's going on with them.

How many break-ins have been attempted? If you don't examine the logs, you may never know that you're under attack until it is too late.

I could go on for several columns about the need for security plans (and I probably will), but for the time being, consider how cool you'll be if your intranet suffers a security breach. Resume writing is simply not cool in the slightest.

So, to be intranet-cool, give the organization visually compelling reasons to use the intranet and have a security strategy that keeps it private, secure and effective.

If your intranet is really cool, we may even see you written up in *IntraNet*. Now that's what I call way cool.

Is your intranet hip and happenin'? Let Gibbs know at mgibbs@gibbs.com or call him at (800) 622-1108, Ext. 504. ☎

Gibbs is a writer, analyst and editorial consultant for IntraNet.



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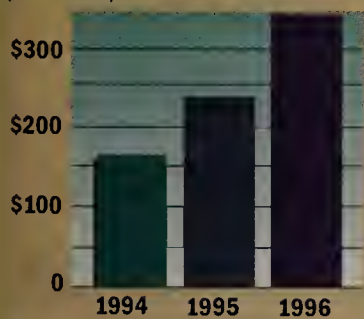
Briefs

■ **Control Data Systems, Inc.** last week shipped MailHub 97, an upgrade to its **messaging switch and directory** that now runs on Windows NT and supports Extended Simple Mail Transfer Protocol. MailHub 97 also has new gateways for CE Software, Inc. QuickMail and Microsoft Corp. Exchange. In addition, users may now access data in the software's X.500 directory from a Web browser. The cost for MailHub 97 ranges from \$50,000 to \$150,000 for software only.

Control Data: (612) 482-2100.

■ **Fulcrum Technologies, Inc.** is shipping an add-on product for its Fulcrum Search Server text retrieval system that works with **PC DOCS, Inc.** Docs Open document management software. The Fulcrum Bridge for PC

WORLDWIDE DOCUMENT MANAGEMENT MARKET REVENUE (In millions)



SOURCE: DELPHI CONSULTING GROUP, BOSTON

DOCS lets users search the contents of documents as well as information stored in document repositories. Pricing begins at \$500 per server.

Fulcrum: (613) 238-1761.

■ **VideoLan Technologies, Inc.** has integrated its VL2000 videoconferencing system with **Opera Systems, Inc.'s** video storage and retrieval archive. By early next year, the companies will ship a version of VL2000 that supports video distribution over existing twisted-pair copper wire. The archiving system costs \$4,700 per seat and about \$100,000 for a terabyte of video storage.

VideoLan: (502) 895-4858.

Infonet launches messaging suite

Messenger WorkPlace Series combines messaging, directories and gateways.

By Barb Cole
Vancouver

Infonet Software Solutions, Inc. (ISS) this week will unveil a messaging suite that combines traditional backbone technologies with tools for managing mail servers and building collaborative applications.

The Messenger WorkPlace Series is a collection of old and new technologies from ISS, and some repackaged third-party products aimed at customers that wish to supplement an existing messaging network or build one from scratch.

At the core of the suite is the company's Messenger 400, an X.400/Simple Mail Transfer Protocol message server, which has been enhanced to support the Post Office Protocol 3 and Internet Message Access Protocol 4 'Net messaging standards.

Other products in the suite include:

- **Messenger Interconnect**, a set of gateways to popular LAN-based and SMTP mail systems
- **Messenger Directory**, an X.500 directory that may be accessed using a Lightweight Directory Access Protocol client
- **Messenger NetMan Plus**, a

graphical tool for managing messaging servers and gateways

■ **Messenger Multimedia**, a set of applications that add graphical fax, voice messaging and video capabilities to messaging servers

■ **Messaging Commerce**, a set of electronic document interchange and World-Wide Web publishing applications

■ **Messenger Form**, an applica-

looking to connect remote offices to corporate messaging backbones.

"This is a good place to look to if you don't feel like rolling your own messaging strategy," he said.

ISS will offer an Enterprise Edition, a Service Provider's Edition and a Developer's Edition that includes customizable APIs.

The server-based components of Messenger WorkPlace run on Microsoft Corp. Windows NT and SunSoft, Inc. Solaris, and may be run on the same machine.

All pieces may be purchased

PROFILE: INFONET SOFTWARE SOLUTIONS

Founded: 1989 (as OSIware)

Based: Vancouver

Primary products: X.400, SMTP and X.500 messaging backbones; gateways for Microsoft Mail, cc:Mail, SMTP/MIME and Novell Global Message Handling Service; directory services; and APIs for custom mail-enabled application development.

Financials: A privately held subsidiary of Infonet Services Corp., a network services provider in El Segundo, Calif.

Key competitors: Isocor, Worldtalk, Control Data Systems

Employees: 70

tion that allows users to share information between messaging systems.

Glenn Gabriel Ben-Yosef, principal at Clear Thinking Research in Boston, said the offering would be particularly appealing to companies that are

Uniface puts new face on apps tools

By John Cox
Amsterdam

Compuware Corp. this week will release into beta test the latest version of its Uniface application development tool set, with new features intended to support building and deploying transaction applications as a set of components.

The changes are important because they let developers easily create middle-tier application servers — programs that hold the application logic and business rules at the heart of most business applications. This tiered approach can support lots

of users and high transaction volumes.

The beta program was announced here at Compuware's annual user conference.

The first general release of Uniface Seven, due in early 1997, will dynamically create HTML documents, which can be viewed by Web browsers. It also will support Microsoft Corp.'s OLE and OLE Custom Control component specifications.

Uniface lets developers create a visual representation, called a model, of an application and then generate the finished code

See Uniface, page 42

Check out white papers on managing enterprise messaging nets.

Enter the number to the right in the DocFinder box on the home page.



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individually or as part of a bundle. The complete suite is priced around \$38,000, and most components will ship next month. The exceptions are the Messaging Commerce and Messenger Form pieces, which are expected by the middle of next year.

©ISS: (604) 436-2922.

Informix bolsters database replication and management

By John Cox
Paris

Informix Software, Inc. this week will unveil tools for copying data across distributed databases as well as managing them.

In addition, the company is integrating its Informix-OnLine database with Web products from Netscape Communications Corp.

All of the tools are designed to make it easier to move data across networked databases and manage remote databases from a single point.

Informix has lagged in replication, which lets customers copy data among different database servers. Now, however, single-user and workgroup versions of Informix-OnLine servers will have a built-in, two-way data replication feature.

The smaller databases will be able to subscribe to changes made in specific database tables on a central database.

Informix will use Praxis International, Inc.'s OmniReplicator product to copy data between high-end Informix servers and non-Informix databases. This option will be sold and supported by Informix.

All of the company's replication offerings will be available on Windows NT and Unix by year-end.

To improve database systems management, the vendor has created Informix-Enterprise Command Center (IECC), a workstation-

See Informix, page 42

INFORMIX EXTENDS ITS GRIP ON NETWORKED DATA

New features target three:

1. Data replication:

Built-in feature lets remote single-user and workgroup databases send and receive changes from a central database.

Copies changed data between Informix and non-Informix databases via Praxis International's replicator, an option now bundled with Informix databases.

2. Systems management:

New graphical management program for managing multiple Informix databases; supports SNMP and Common Object Request Broker Architecture/Internet Interoperability Protocol object messaging.

3. Web support:

Single-user and workgroup database now bundled with Netscape Navigator 3.0 and Netscape FastTrack Web server software; lets Web browsers work as clients for database applications.

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- Understand key internetworking protocols such as TCP/IP, IPX/SPX, X.25 and XNS
- Determine bandwidth requirements for both leased line and broadband circuits utilizing traffic studies

- Troubleshoot your environment through case studies that detail protocol operation and illustrate typical internetworking challenges
- Understand the key internetworking features of AppleTalk, Banyan VINES, NetWare, OS/2 LAN Server and Windows NT
- Discover some key applications for narrowband ISDN technology

- Compare the operation of ATM, frame relay and SMDS, and discover the role of the broadband implementers: the Frame Relay Forum, the ATM Forum and the SMDS Interest Group
- Understand the detailed operation and key performance characteristics of Ethernet, IEEE 802.3, token ring and FDDI
- Evaluate the differences between Transparent Bridging, Source Routing and Source Routing Transparent Bridging internetworking standards
- Utilize available software tools for network optimization and modeling process
- See how SNMP plays a key role in internetwork management including the management and operation of broadband networks
- Understand the operation of IP-based routing
- Match the LAN application with the appropriate WAN broadband technology
- Understand TCP/IP and the Internet protocol suite, including ARP, ICMP, UDP, SMTP and TELNET
- Explore the internetworking challenges of remote access and wireless communications

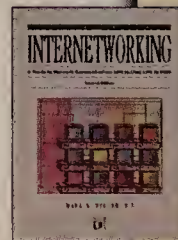
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SHARED LOGIC

Oracle's NCA: You've gotta believe

Last year at Comdex, I saw Oracle Corp. Chairman Larry Ellison give a talk about a silly Network Computer (NC) that he wanted to build. A week ago, I saw

a beta of the NC running at a trade show in Basel, Switzerland, and it was pretty cool: a \$500 slick black box that connected right to a TV and flipped seamlessly

between word processor and Internet browser. So now I've decided to take Mr. Ellison's announcements more seriously.

Earlier this month, Oracle's Network Computer Architecture (NCA) made its debut (NW, Sept. 30, page 1). I was tempted to believe that this architecture would be specific to the new NC, but in fact it is a much more far-reaching

attempt to define a cross-platform, object-oriented, network-centric development and deployment architecture. Sounds like a dream come true.

But first it will require that you agree with the direction of the Object Management Group (OMG). NCA is based on OMG's evolving Common Object Request Broker Architecture (CORBA) standard.

At its most basic level, NCA is a distributed object environment based on a CORBA/Internet Inter-ORB Protocol (IIOP) software infrastructure. It is designed to support any client, including those based on development architectures from Netscape Communications Corp. and Microsoft Corp.

If you buy into the CORBA direction, then what? You enter the world of "cartridges," containers for objects or software components that make up NCA. Because a cartridge encapsulates other objects, developers can choose from a set of supported languages, object models and APIs for object construction. Cartridges will be supported across all tiers — client, application server and database.

Marc Myers

Cartridges communicate using a protocol known as Inter-Cartridge Exchange. This protocol lets cartridges communicate across distributed architectures using IIOP or HTTP.

In order to use cartridges on the database server, however, there is one small requirement: You need Oracle Universal Server. And likewise on the application server, you will need Oracle Universal Application Server. But the payoff is significant. For example, you will be able to write a database server cartridge in PL/SQL, C/C++ or Java and plug it into the Oracle Universal Server, which will use IIOP to let the cartridge communicate with other cartridges.

If you run the Oracle Universal Application Server, you can support Web cartridges based on HTTP, CORBA cartridges based on IIOP and cartridges based on Java. These application-tier cartridges will be able to communicate across application servers running on any hardware and operating system platform.

What NCA promises is that communication between client/server and Internet applications will be seamless. Oracle has promised that in Oracle Server 7.3.3, available by year-end, existing PL/SQL stored procedures will be able to make external calls to Web cartridges linked to Universal Application Server.

Oracle is already taking orders for Oracle Net Solutions, the first development tool kit for cartridges, which the company promises to ship in November.

Myers is CEO of Client/Server Connection, Ltd., a New York-based software development company. Contact him at mmyers@csc.com.

Suite Maestro

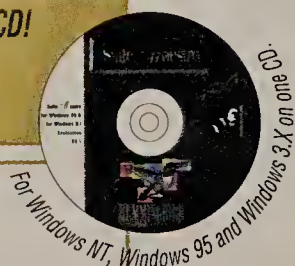
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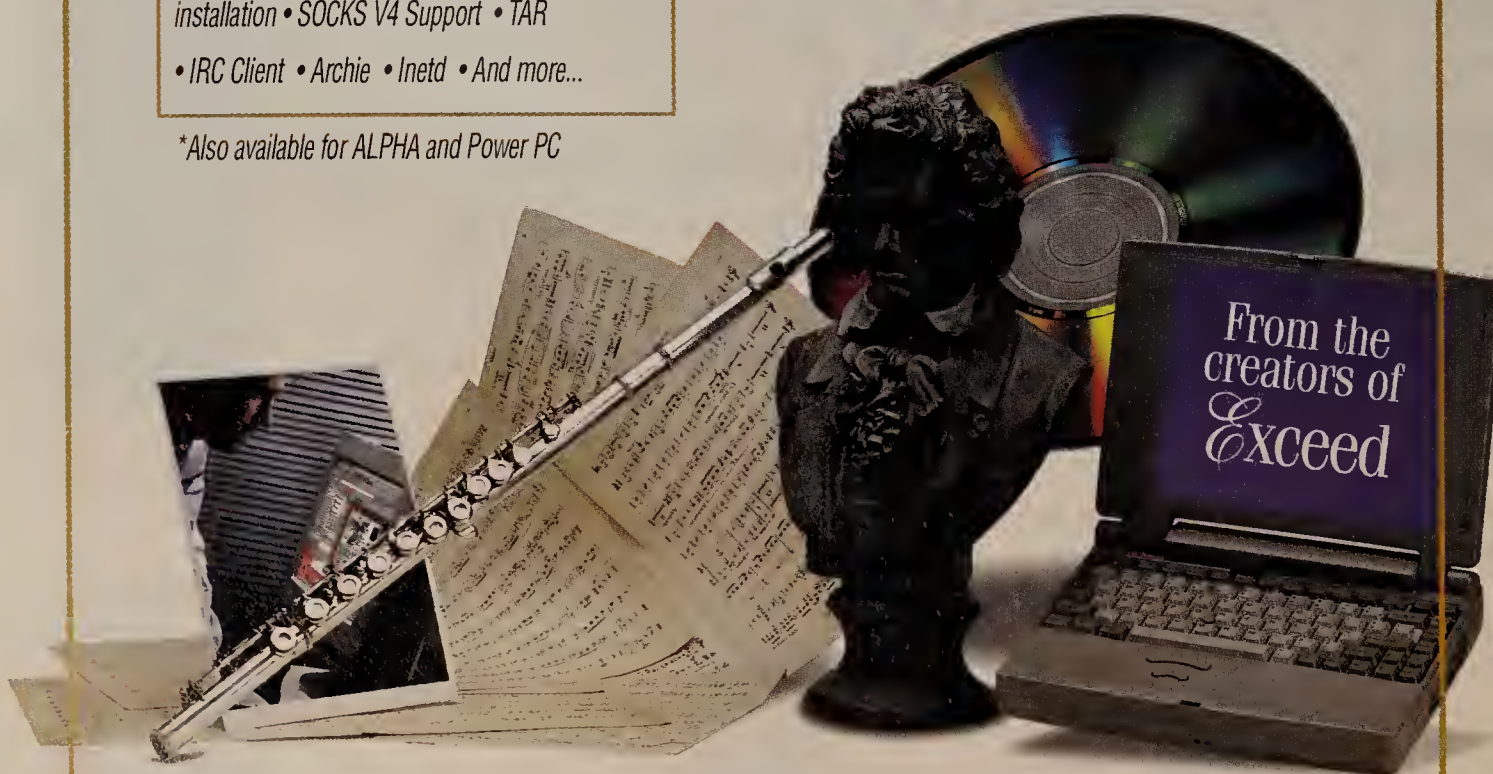
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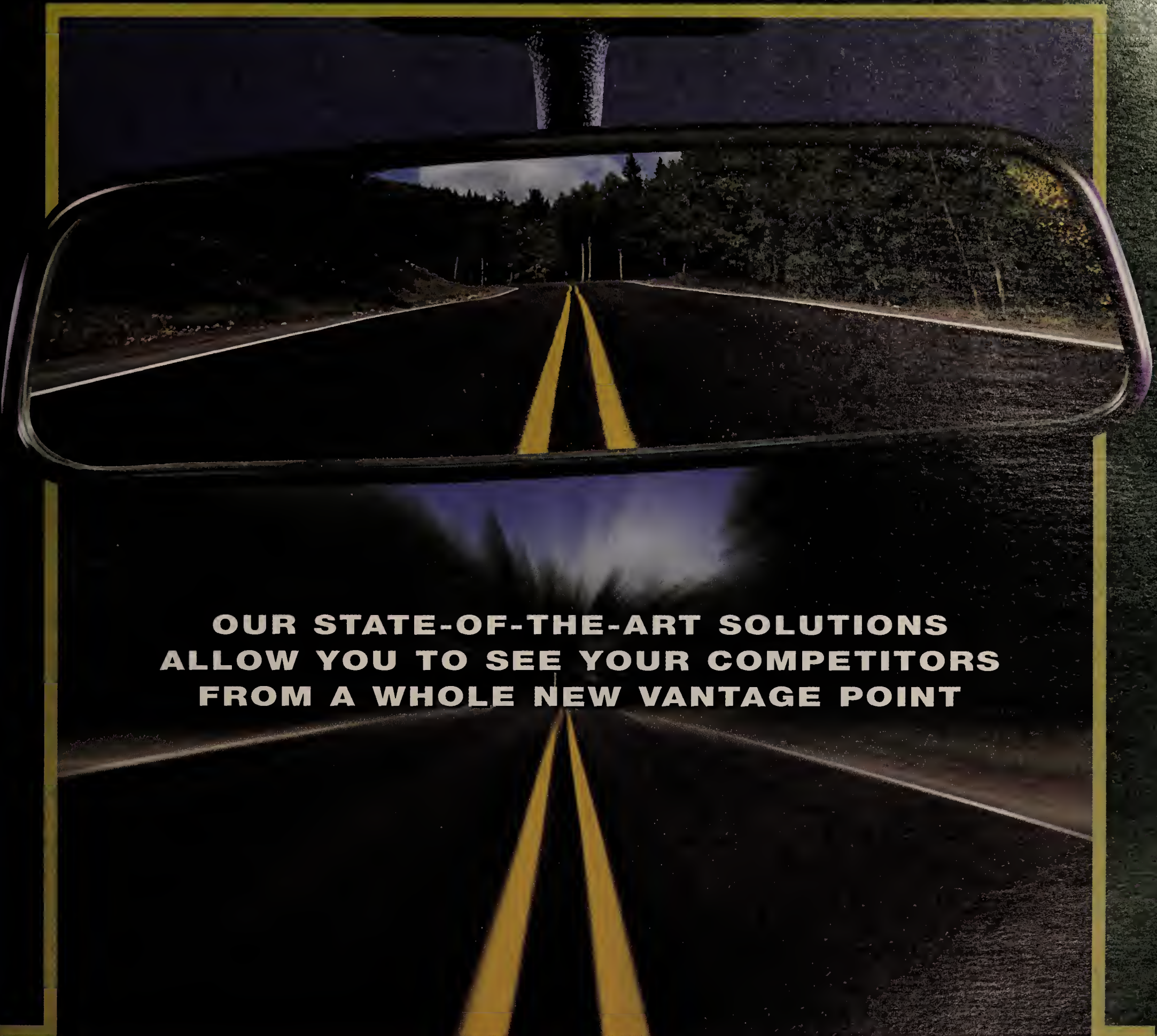
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Post-it Note junkies get E-mail add-on

By Barb Cole
Kirkland, Wash.

Users who indulge in Post-it Notes can now slap electronic versions of the yellow sticky squares onto E-mail messages.

Wall Data, Inc. this week will roll out

Rumba Mail featuring 3M's Post-it Software Notes, an E-mail add-on that lets users send and receive messages using the familiar note metaphor.

Users who wish to create the electronic notes install client software that shows up

as an icon on Windows desktops and dispenses blank Post-it Notes that may be affixed to messages. Composing a Post-it Note launches the Rumba Mail Comm-corder, an interface that works with a user's mail in-box and provides access to basic functions such as file attachment, printing, return receipt and mail priority.

On the receiving end, the client-based

Rumba Mail Tray lets users get Post-it Note messages from multiple mail systems.

"This makes the E-mail interface a bit more playful," said Mark Levitt, an analyst at International Data Corp. in Framingham, Mass. Besides making mail systems easier to use, the software could help companies transfer information between disparate mail systems, he said.

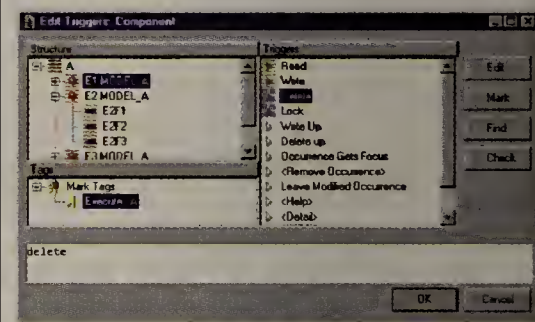
The software will ship later this year. Pricing ranges from \$39 per user for a version that supports Internet messaging systems to \$149 per user for a version that works with multiple mail systems.

©Wall Data: (800) 915-9255.

Uniface

Continued from page 37

from the model, which is stored in a central repository. The new features in Uniface Seven include the ability to create server-based programs as a series of components in a model.



A rebuilt user interface, for Windows 95, gives application developers using Uniface Seven a visual framework for organizing and finding information.

The developer's user interface, called the Developer Workstation, has been revised to support the Windows 95 look and feel for easier navigation.

Also new is the Uniface Application Server, code that provides the needed services to run the application on a middle-tier server. In addition, Compuware has created the Uniface Name Server, a directory service that tracks the names and network addresses of all the components. A new graphical Partitioning Manager lets developers visually move components among clients and servers.

©Compuware: (800) 521-9353.

Informix

Continued from page 37

based management system that can oversee thousands of database servers. Previously, a less comprehensive graphical management tool was available only for the Informix workgroup server. The IECC also supports SNMP.

Finally, Informix is bundling Netscape's Navigator 3.0 browser and Enterprise Server Web server with its single-user and workgroup databases. It is offering the Netscape software as an option for its enterprise database product.

The bundle is available now at no extra charge with Informix's low-end products; pricing has not been set for the enterprise server option.

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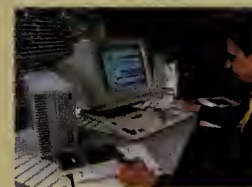
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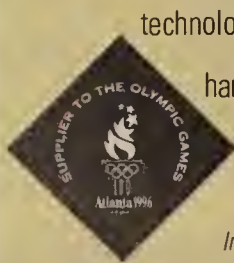
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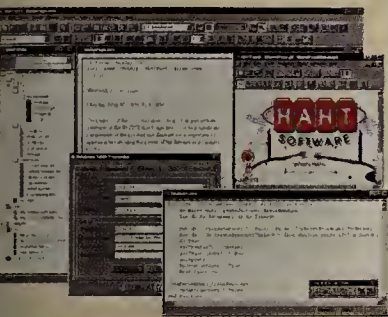
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Briefs

■ **HAHT Software, Inc.** last week started shipping **HAHTSite 2.0**, a **World-Wide Web site application development tool kit** for graphics and text that includes an application server



and software developer's kit that lets users create 14 Web code components, such as a password and ID dialog box.

HAHT Software: (919) 783-7803.

■ **Iona Technologies, Inc.** is now shipping **OrbitWeb 2.0**, a **Java compiler** that lets developers build applets that work with **Common Object Request Broker Architecture** services.

Iona Technologies: (617) 679-0900.

■ **Intelligent Environments, Inc.** this week starts shipping **Amazon 2.0**, a **Web development tool** for taking order entries or other data received at a **Netscape Communications Corp. server with NSAPI** or a **Microsoft Corp. Web server with ISAPI**. Amazon then hands that data off to a **Windows NT-based application server** for retrieval of information stored in database products from **IBM, Sybase, Inc., Oracle Corp.** and **Microsoft**. The NT-based Amazon server then performs the needed calculation of HTML and database information by converting data into text strings.

Intelligent Environments: (617) 272-9700.

■ **Network Engineering Technologies, Inc.** is shipping a **firewall**, called **Telaxion Shield**, that can control access to standard TCP/IP applications across the Internet. Pricing starts at \$7,995.

Network Engineering Technologies: (408) 453-7500.

New wave of 'Net marketing invades consumer privacy

Expect the next to be collecting your E-mail address and personal data off X.509 digital certificates.

By Ellen Messmer
Washington, D.C.

In a *New Yorker* cartoon published last year, a canine sitting at a computer says with satisfaction, "On the Internet, no one knows you're a dog."

But that dog's secret is probably out, with Internet service providers and Web sites now collecting — and selling — data on 'Net users at an unprecedented rate. Ever-improving World-Wide Web data-gathering tools are tracking every move users make, whether they know it or not.

And while marketers say it is still hard to pin down identity and E-mail address, that is expected to change with the advent of X.509 digital certificates.

"Standard X.509 certificates will have the user's name, E-mail [address] and a wealth of other information that will get picked up at the Web site," said Paul Grand, chairman of NetCount, Inc., a third-party tracking service operated with Price Waterhouse.

Currently, it is hard for Web sites to get anything but an IP address. However, some Web sites will try to automatically download a software "cookie" to a visitor's PC in order to identify return visitors. As a result, it is not uncommon for Web visitors to read ads targeted personally at them based on a history of past preferences or even the operating system and browser they use.

Early next year, NetCount will offer Head Count with a feature to capture the user's X.509 certificate information.

"There's a big privacy issue around this," Grand acknowledged. He added that the company does sell demographic information it collects but never the name or E-mail address.

Web-based advertising is not much more than a year old. And while ad agencies such as Western International Media and

Saatchi & Saatchi had been placing cyberads on blind faith, they are now demanding hard figures about who reads them, paying about 3 to 10 cents "per exposure," Grand said.

The pressure to collect data far more accurately than can be done in television or print advertising is turning Webmasters into Big Brothers who watch everyone. But Web sites seldom notify the visitor that their activities are being monitored, logged and used for marketing.

Like many others, American Express Corp. plans to collect user data at its ExpressNet site and rent its customer E-mail lists to third-party marketers. However, American Express will give

Net Internet service and rents its E-mail list to companies such as Microsoft Corp. AT&T attorney James Gleason said the carrier will soon be posting an online privacy policy that gives AT&T 'Net subscribers a way to opt-out. MCI Communications Corp. public policy counsel Matt Nydell said MCI is now revising its Internet policy and may use its 'Net subscriber base for marketing purposes, but it will not rent E-mail lists.

America Online, Inc. (AOL) has heard a lot of customer complaints about junk-mail barrages, popularly known as spams. AOL issued its privacy guidelines in June and has now gone on the offensive against junk mail, suing Cyber Promotions, Inc., which refused to stop sending unsolicited cyberads to AOL customers.

"Junk mail threatens the integrity of the network," said Bill Burrington, AOL's director of law and public policy. "Almost half the E-mail going across our network at one point was spam."

However, AOL reserves the right to spam its own customers and sell AOL E-mail lists to marketers that register with AOL.

Silicon Valley and the feds

Some Web sites, such as 'Net bookseller Amazon.com Books, do post privacy policies and provide a way to opt-out, but most still do not.

Privacy advocates, legal experts and, perhaps more ominously, the federal government, are all warning businesses that if they do not come up with some self-policing standards soon, they can expect consumer backlash and new privacy regulations.

"[Consumer] consent is the absolute minimum," said Federal Trade Commissioner Christine Varney. If Web-site operators and ISPs do not com-

ply, they can expect the Clinton administration and Congress to pass legislation to regulate Internet privacy. Just the thought sends shivers down the back of Silicon Valley executives.

"We're concerned about having fight after fight on privacy the way we did with the Communications Decency Act," acknowledged Netscape Communications Corp. attorney Peter Harter. He said many industry players are fearful of "bad regulation or bad legislation."

Privacy-enhancing technology?

The high-tech industry and marketing mavens seem to be slowly waking up to this explosive issue. Several industry proposals are now out for using what is being called "privacy-enhancing technologies."

The Electronic Frontier Foundation is leading the charge with eTrust, which would have Web sites display a picture of an open eyewhen user data is being collected or a closed eye when it is not.

Some companies are coming out with products that let users take privacy matters into their own hands. PrivNet, Inc.'s Fast Forward plug-in for the Netscape browser can block out Web site ads or the cookies that get

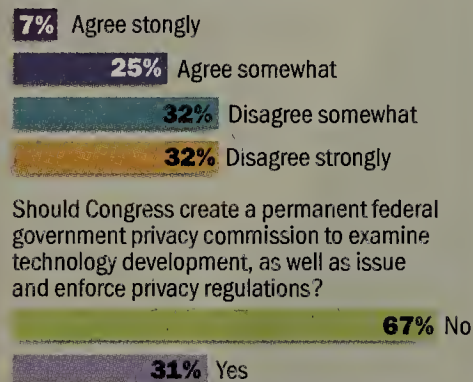


NetCount's Grand says company "solemnly swears not to sell user names."

Hey, can I get some privacy?

Results from the 1996 Equifax/Harris Internet Consumer Privacy Survey

Providers of online services should be able to track the places users go on the Internet in order to send them targeted marketing offers.



Based on a survey of 1,005 people.
SOURCE: EQUIFAX AND LOUIS HARRIS & ASSOCIATES

electronic commerce customers a way to "opt-out" of being used for marketing, said American Express Chairman John Linen at the recent Privacy in Cyberspace conference here.

"For those who merely browse, we won't send an unsolicited mail message," Linen said, adding that American Express's privacy policy will be clearly posted. "Our failure to act responsibly could precipitate disaster."

ISPs and junk mail

ISPs are also collecting and selling data about their subscribers. AT&T sends marketing E-mail to customers of its World-

Get more info about:

- Cookies and how to turn them off
- An Internet service provider's victory in a legal battle with a spammer
- The eTrust proposal

Enter the number to the right in the DocFinder box on the home page.



<http://www.nwfusion.com>

NOT INSIDER

The SYNs of the vandals

Nothing annoys some people more than a normally running system. To these people, an undisrupted environment is a window of opportunity, much

like a blank wall is an irresistible canvas for graffiti "artists" or a quiet cemetery provides a chance to desecrate. The most recent large-scale example of this type of

vandalism on the Internet has been the widespread "SYN" attacks on hosts and servers worldwide.

For those of you who have not heard, these attacks occur by bombarding a TCP/IP host with requests to initiate new communications sessions. When one of these requests — in the form of a packet containing a SYN (which stands for syn-

chronize) flag — is received, an acknowledgment is sent back to the requestor, and the information from the packet is saved in a buffer, pending a second packet from the requestor to complete the handshake needed to establish a new session. Once a session has been established, the packet information is deleted from the buffer.

If one were to flood a host with SYN packets with random source addresses, the buffer would fill up because there would be no actual requesting host to send the second, handshake-completing packet. If the buffer fills, the establishment of new legitimate sessions is blocked.

There have been two types of defenses developed against the SYN attacks. You can either prevent the attack from reaching its target, or you can make the target less vulnerable to the attack.

An example of the first type of defense is to have Internet service providers add filters to their routers to make sure packets from a particular customer have source addresses from that customer's assigned set of IP addresses. But with thousands of ISPs, some quite clue-challenged, it is unlikely this strategy can be all that effective.

An example of the second type of defense is Early Random Drop (ERD); the host software is changed to delete a random entry from the buffer whenever a new SYN packet would cause the buffer to overflow. If the buffer is a reasonable size, then the chance that a legitimate entry would be dropped is minimal and a legitimate request will generally be repeated by the initiating host.

A number of vendors have revised their host software to perform ERD, including Tenon, the maker of MachTen, the Unix system I use on my Macintoshes.

I do not claim to understand the psychology (or pathology) of vandalism, but it is clear that the users of the Internet have to worry about this. Many Web sites have been attacked using the SYN approach in the past few weeks, including, I think, my own machine — thus my request to Tenon for a fixed version. These attacks have not taken down the 'Net, but they have inflicted much local pain.

System operators, equipment vendors and ISPs must keep the vandals in mind when designing operating devices and systems. If you own a Cisco Systems, Inc. router and want an example of what a vendor (and you) should do, take a look at <http://www.cisco.com/warp/public/707/3.html>.

Disclaimer: Twits don't make it into Harvard, at least through the admissions process. In any case, the above reflects my own irritation.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached at sob@harvard.edu.

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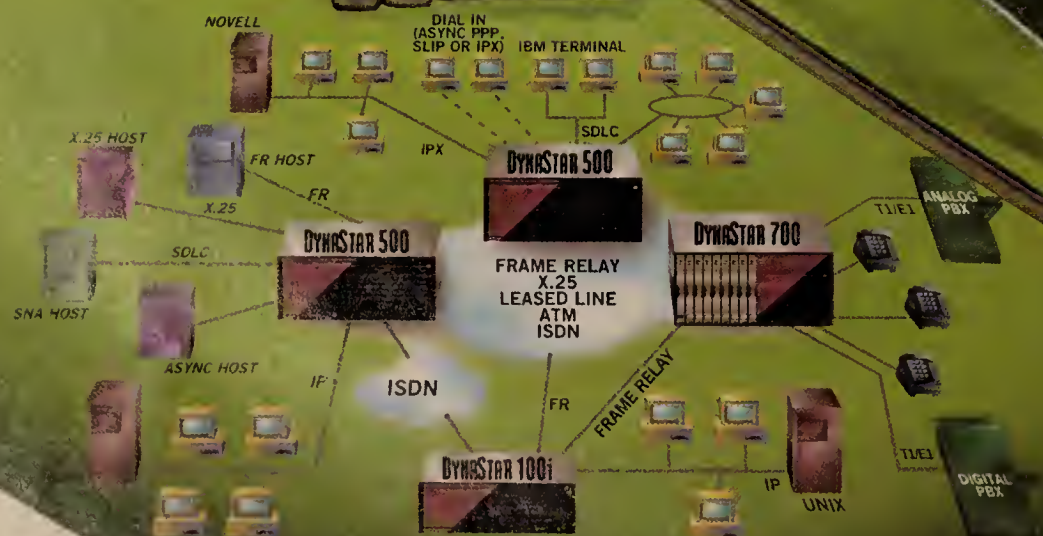
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Technology Update

Keeping Up with Network Technologies and Standards

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Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476 or send your questions to rnutter@world.std.com.

You recently advised a reader to use 16M bytes of RAM for every 1G bytes of a server's mountable disk space (NW, Sept. 23, page 45). My company is thinking about using either Novell, Inc.'s NetWare 4.X or Microsoft Corp.'s Windows NT 4.X, with at least 9G bytes of disk space to start. Does your advice hold for these platforms? If not, what do you recommend?

Via the Internet

For NetWare 4.X, you can follow the 16M bytes of RAM for every 1G byte of mountable disk space rule. This will cover the amount of memory used caching the file and directory tables that will be on the mounted volume or volumes. When you're calculating the disk space, remember not to include the drive space that will be used for mirroring or duplexing. These drives are not actually mounted, but rather mirror images of what is being mounted.

You'll also have to identify which NetWare Loadable Modules will be loaded on the server and how much memory they will need to run properly. And you'll need to plan for tape backups. Server-based tape backup solutions run best when they have between 8M and 16M bytes of dedicated RAM. It's a bit more difficult to figure the amount of RAM needed for NT 4.X, since this product has only recently started shipping. Look at article ID Q130100 in Microsoft's knowledge base for the company's determination of how much memory you'll need for NT server. To be sure you get enough memory, pad that figure anywhere from 25% to 50%.

Due to the significant amount of drive space you're planning to mount, you should consider using Compaq Computer Corp.'s RAID system with the new Smart Array-2 RAID Controller. Under NetWare, this will let you add drive space or replace a failed drive without downing the server. NT offers similar flexibility, except you'll have to restart the server after adding drive space.

LDAP: Why it's so hot

Not as processor-intensive as the X.500's directory access protocol, LDAP provides the security, scalability and manageability needed for today's networks.

By Eugene Lee

More and more business users are connecting to the Internet, and an increasing number of companies are beginning to use intranets for networking. Yet companies will not widely adopt Internet-style computing until they are certain intranets can provide the security, scalability and manageability they have come to expect from proprietary networks.

directory services. LDAP runs over TCP/IP and can be used to provide a stand-alone directory service or lightweight access to X.500 directories.

An official IETF standard, LDAP is described in RFC 1777. It is a subset of the Directory Access Protocol (DAP), which is used to build X.500 directories. DAP only runs on Open Systems Interconnection protocol stacks, and requires much of a PC's pro-

cessing power to run. Developers such as Netscape like LDAP because it offers a friendlier, easier programming interface than X.500 and DAP. Developers find LDAP easier to implement because it uses simple text strings for coding rather than more complicated formatting.

Most importantly, the companies or developers view LDAP support for their applications as providing added value to their customers.

Business users, in turn, are finding an open, universal directory service beneficial. A ubiquitous directory service eliminates complexity. Users no longer have to view the network in terms of its servers; users have a unified

view of the enterprise. With LDAP, they can access directory information from any LDAP-compliant directory service, including those outside their organizations.

LDAP and then some

Vendors are teaming to deliver best-of-breed solutions based on LDAP. For example, Software.com, Inc. and Coordinate.com announced this summer they are teaming to offer an open, standards-based intranet messaging server that integrates the LDAP-compliant StreetTalk directory service.

Vendors are also developing their own extensions to LDAP. Netscape says it will add LDAP, including its own extensions, to all of its new servers — a directory server, mail server and certificate server — and to the fall release of the Navigator browser. Navigator will contain an LDAP-compliant address book and E-mail applications.

Although LDAP will provide a similar means for applications to find directory information, extensions to the protocol for storing directory information will mean differentiation and competition among different vendors' directory services.

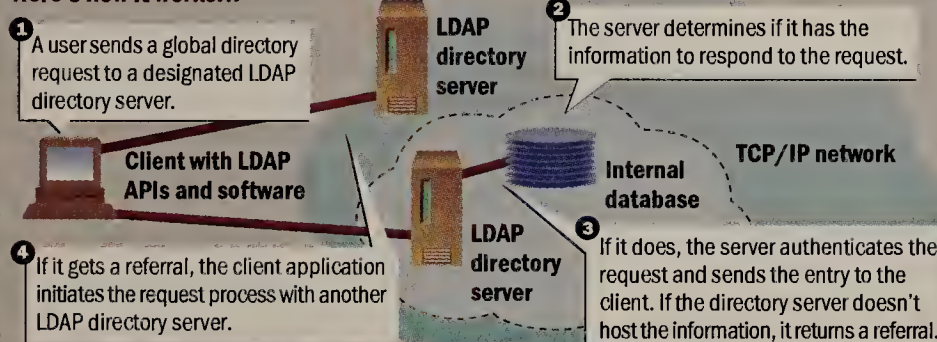
With the growing recognition of the need for directory services for intranets, LDAP will most likely be widely adopted within a year. Features such as enhanced security will be added to make intranets an open, standard way of networking for businesses. While LDAP makes intranets robust for business use, customers will be able to choose best-in-class applications and directory services rather than the best directory access technology.

Lee is vice president of marketing & business development at Coordinate.com, the Waltham, Mass.-based Internet division of Banyan. He can be reached at elee@coordinate.com.

LDAP IN ACTION

The Lightweight Directory Access Protocol (LDAP) streamlines the directory service approach of the X.500 standard by limiting the number of replies to a client's request for directory information.

Here's how it works...



...and why it's worth a look:

- Consumes relatively little processing power and bandwidth
- Is easy to use
- Crosses applications and enterprises
- Has wide industry backing

A directory service can address these needs. It names, describes and locates users and resources throughout an organization to simplify communications and administration. A directory service lets users find resources and other users through simple searches. It helps administrators collect and control information scattered throughout the organization, and gives them a unified view of that information.

Businesses of all sizes are just now starting to understand the value of a directory service, particularly with the rise of intranets and the development of the Lightweight Access Directory Protocol (LDAP), a widely supported directory standard.

Lightweight, but powerful

The protocol, which was written at the University of Michigan at Ann Arbor with a grant from the National Science Foundation, is used for accessing online

cessing power to run.

Like DAP, LDAP was designed to extract information from hierarchical directories. But unlike DAP, LDAP limits the number of replies from an X.500 directory query in an effort to conserve network bandwidth.

Although LDAP has been around for a while, it gained attention and credibility in April when 40 vendors — led by Netscape Communications Corp., and including Banyan Systems, Inc., Lotus Development Corp., IBM and Novell, Inc. — committed to supporting the standard.

This widespread acceptance will create a new class of directory-enabled applications that will make intranets more robust for running businesses.

Customers will soon be able to select best-in-class client and server applications from multiple vendors with the confidence that these products will seamlessly interoperate with other LDAP-compliant offerings.

view of the enterprise. With LDAP, they can access directory information from any LDAP-compliant directory service, including those outside the enterprise.

Administrators benefit by being able to manage change. No longer do they have to add or remove user identities to and from multiple applications on different servers. Consistent, scalable tools to monitor, manage and secure applications across the enterprise are additional perks for administrators.

A natural application to benefit from LDAP support is intranet E-mail, which can use directory services for dynamic browsing, message routing, user security and configuration of message transfer agents. Administrators can use directory services to find where user mailboxes are located instead of having to maintain individual address books. And users of LDAP-compliant E-mail can search for list-

For more information on LDAP, including an explanation of its hierarchical tree structure, see the IntraNet Handbook in this month's edition of our IntraNet supplement.

EDITORIAL INSIGHTS

Take me, I'm yours

An open letter to Cisco, Fore, 3Com, IBM, et al: I'm available to be acquired.

I have developed — conceived anyway — a gigabit-speed Arcnet switch that sits at the network's edge, is highly scalable (its nonblocking architecture can ratchet up to 1 terabit-per-second capacity) and is fully Web-manageable. It can bring those millions of forgotten Arcnet and LANtastic users into the switched world of tomorrow.

This brainstorm came to me as I was walking the NetWorld+Interop show floor last month and was struck on the head by an errant bowling pin tossed by a juggler at one of the booths.

Laying on the floor while would-be good Samaritans fanned my bloodied brow, the image of this powerful new device took shape in my brain. I have since sketched the box on the back of an interoffice envelope, and I'm designing the Application Specific Integrated Circuits (ASIC) on my son's Etch A Sketch.



Now, as CEO of Arcdetriomphe Systems, Inc., I'm looking for just the right strategic partner, the best home for my technology baby. In this industry, where start-ups are snapped up like flies before trout, you have to move quickly. Someone better take my technology out of play — and fast!

Consider me the next Granite Systems, the fledgling Gigabit Ethernet maker bought by Cisco for \$220 million. All they had was an idea, some ASIC technology and a bunch of engineers. My product would probably get out the door sooner than theirs.

I want to be the next Granite. Or the next Agile, Crescendo, Xylogics, Kalpana, ZeitNet, Alantec, NetStar, Network Express, Nashoba Networks, NetWorth, Thomas-Conrad, Armon Networking, Centillion, Axon Networks, AirSoft, Micom, StrataCom, LightStream, ChipCom, Tivoli, Performance Technology, Internet Junction, Network Translation...

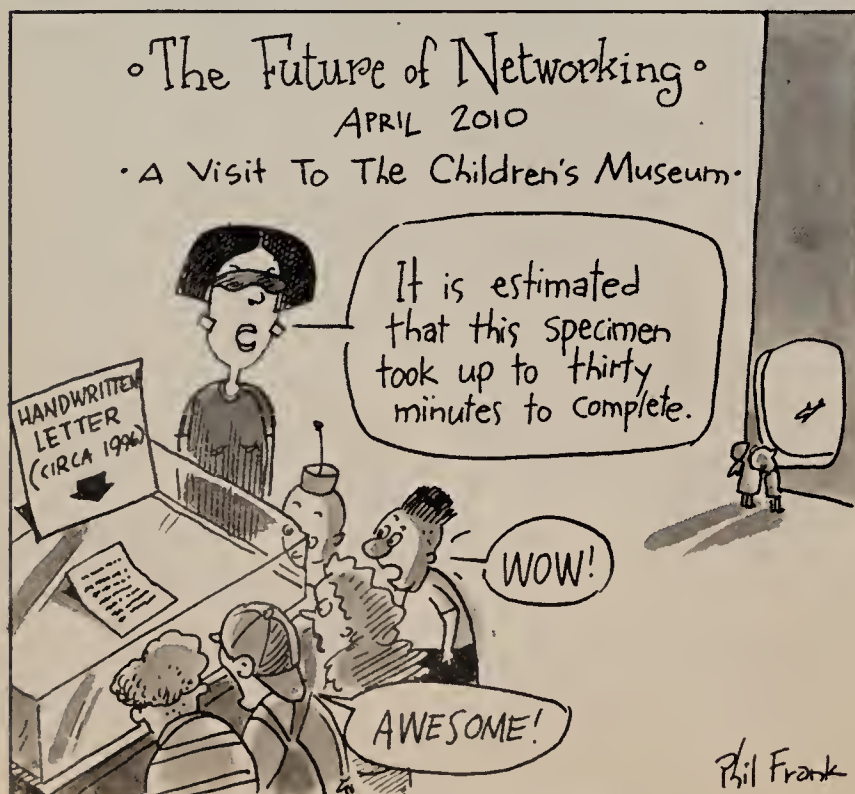
I'm in a bargaining mood. I'm not getting any younger — the big 40 looms — it's time to make the big money. So, Messrs. Chambers, Cooper, Benhamou, or Gerstner, any offers? How's \$300 million sound? Alternatively, I'll take scads of venture funding. Are you listening Accel? Mayfield? Battery Ventures?

John Gallant, editor in chief

jgallant@nww.com

Teletoons

By Phil Frank and Joe Troise
baba@sfgate.com



REALITY CHECK

The truth about IP switching



Thomas Nolle

IP switching, a method for making the ever-popular Internet Protocol work faster through the use of ATM switching, has become the networking flavor of the year. ATM vendors see it as a way of rehabilitating ATM's now tarnished image. IP supporters see it as the ultimate validation of the Internet's superiority. What's being lost in all the hoopla is the fact that IP switching may not be as good for IP, or ATM, as we think.

The basic concept of IP switching is to marry an ATM switch to a router. A network is built using ATM trunks to link these combination products. On each trunk, there's a single virtual circuit defined linking the router part of the combination switch/router at each end.

The logical structure of this network, therefore, is the same as the physical topology — nodes and links. That topology is discovered using traditional router protocols such as Open Shortest Path First (OSPF), and a routing table is built for each router.

When information starts to flow through the network, the routers find a path for datagrams just like they always do. This data flows between routers over those default virtual circuits.

The routers watch the data flowing through, looking for something that's a candidate to switch. When a persistent flow of datagrams is detected along a route, the routers first isolate the flow to its own virtual circuit. This creates another virtual circuit on each of the ATM links over which the original route passed.

Like the default, the second virtual circuit still connects the routers at each end, but it carries only that persistent flow. A router-to-router protocol, called the Ipsilon Flow Management Protocol, coordinates this process of flow isolation.

The next step is to cut the routers out of the loop. Each of the routers commands its local switch to cross-connect the inbound and outbound virtual circuits that carry the persistent flow, cutting the flow through the ATM switch rather than taking it through the router. A router-to-switch protocol — General Switch Management Protocol in the Ipsilon approach — is used for this process.

Now only the first and last routers in the path are still in the flow, and everything else is a kind of ATM switched virtual circuit connection that goes away when the flow ceases. Neat, huh? Yes, but there are some issues here we need to examine.

First, the process of route selection takes place at the IP level, with no knowledge of ATM network route metrics. That means no quality of service (QoS) routing beyond what is already supported by OSPF and Routing Information Protocol (which is essentially nothing).

This isn't a problem if you don't plan on QoS-specific services, and to be fair, virtually all IP routing today doesn't support QoS. But everybody who's interested in IP switching is also interested in the Resource Reservation Protocol for QoS man-

agement. Does it make sense to pursue making service reservations while building networks that can't fill them?

The second problem is a bit more complex. None of the ATM switch's call handling processes may be used to build virtual circuits.

Ipsilon Networks, Inc. says its IP switching eliminates the overhead of ATM's Private Net-

work-to-Network Interface and User-Network Interface (UNI). Yes, but at the loss of the ability to monitor switch resources. How much did that last flow take in terms of resources? Are there enough resources left to isolate this new flow? No UNI, ATM call admission control, traffic policing or QoS.

In fact, if native ATM traffic is traveling through the same set of switches and trunks as the IP switching traffic, each may not even be aware of the other. That doesn't sound like a formula for effective traffic management, but how many IP switching users would be willing to limit their use of expensive ATM switches to strictly IP switching? Shouldn't ATM switches at least support ATM services?

That brings up the final issue, one expressed in the name of the concept itself: IP switching. It's great if you have all IP traffic. According to one of CIMI Corp.'s late 1995 user surveys, about 21% of corporate desktops have an IP stack for LAN/internet access. Of these, about 8% run IP exclusively. If we count IP-only companies as the targets for IP switching, only 2% of corporate desktops are found there. Can we really justify claiming "industry revolution" when we've solved the problems of only 2% of our users?

Yet it's not IP switching that's the problem here; it's us. Why does every concept that comes along have to be the universal solution, the savior of industrial civilization? Can't a product

or idea be useful for a few things? Can't we examine the details of each new idea with the goal of making the most fundamental of all judgments — what's it good for?

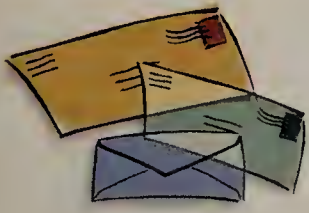
There is good in IP switching. Ipsilon uses a unique TCP/IP header analysis mechanism of flow classification to determine what might be a persistent flow worthy of switching attention. It's better than the "everything to a single destination is a flow" approach taken by the ATM Forum's LAN Emulation and Multiprotocol Over ATM. IP switching handles multicasting better than these standards, too.

But this doesn't justify the uncritical enthusiasm IP switching has generated.

Only by looking at its limitations can we ever hope to make things better. Let's hope we see some constructive changes in the IP switching concept — and soon.

Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or via the Internet at tnolle@cimicorp.com.

MESSAGE



QUEUE

Reader's digest

I enjoyed Dave Buerger's column "With so much information, who has time for real work?" (Aug. 5, page 62). I didn't get to it until today because it was part of that 4-foot stack next to my desk that Buerger so magically knew about.

I took to heart Buerger's advice and have resolved to not feel guilty anymore because I haven't spent the necessary time reading all the learned and in-depth tomes and journals about the latest technologies.

David Frost, the British TV journalist, had a series of books out a few years back called the "Bluffer Series." They contained digestible descriptions of everything you needed to know to make yourself an instant expert on art, ballet, literature and so forth. I'd be willing to throw away all my stacks of technical literature for a solid guide like that.

Michael Bonino
Technical consultant
SCH Technologies, Inc.
Cincinnati

Charity begins at home

I was really taken aback by your story "How to import network specialists" (Sept. 9, page 61). I would much rather have seen an article on how to get our high schools up to speed.

Have you taken the time to look at the curricula in some of our schools? They're hideous! Some of our institutions of higher learning are just as bad. There is no reason for this. Why don't some of our larger companies invest at home a little more? We're already sending a lot of programming offshore. It's not because we don't have the talent; it's because most companies just want a quick fix and don't care enough about their employees to bring them up to speed.

Joe Craparotta
Lindenhurst, N.Y.

To your health

Regarding your two-part Internet health report (Sept. 16, page 1; Sept. 23, page 57):

Internet service providers have options today for solving some of the packet loss and instability problems on the 'Net. Deadly route flaps, for instance, can be lessened by moving responsibility for backbone trunk management from the routers to data link layer switches, such as frame relay or ATM

switches. This division of labor gives the routers more cycles for routing packets while switches handle packet transmission without the latency of router hops. Responsibility for any link-state changes falls to the switches, which, for the most part, keep link changes transparent from the routers and greatly minimize route updates and route flaps.

In addition, the Resource Reservation Protocol (RSVP) will offer powerful new functionality that will let end stations request a certain quality of service (QoS) on the fly. In the core of the network, frame relay and ATM offer QoS efficiently without having to involve the software-intensive IP layer. The committed information rate parameter of frame relay offers QoS on the 'Net today and can be configured by users or applications as appropriate. And as your articles mentioned, ATM offers a whole host of traffic descriptors for guaranteeing QoS today. When RSVP is ready for prime time, it will be most useful at the customer premise, while edge routers will use emerging IETF standards to translate those requests to already well-defined frame relay or ATM QoS descriptors.

While I subscribe to the mantras of the Internet, including "connectivity is the goal" and "IP on everything," it's time to focus on what IP was designed to do and leave some of the lower level transmission and QoS issues to switches. Routers are designed to make packet-level decisions, while switches are designed to make the link-level and delay decisions.

Maria Simoneau
Market development manager
Cascade Communications Corp.
Westford, Mass.

Rhyme and reason

I enjoyed the short poems in Mark Gibbs' column "Of greeting cards, broken laptops and disgruntled users" (Sept. 23, page 74). They reminded me of the old Burma Shave verses. I'd like to suggest starting a collection of these. Here are a few of my own:

Win95

Oh, what a joy!

It turned my PC

Into a toy.

• • •

One year ago

Win95 made a splash

And now Mr. Gates

Has all of our cash.

• • •

IBM lost

On the desktop

'Cause OS/2

Was a big flop.

Jim Meyers
Systems development specialist
Sundstrand Aerospace
Rockland, Ill.



Mail call

Regarding your article "U.S. Postal Service to lick E-mail security problem" (Sept. 23, page 14):

It's not the security problem that bothers me. What really concerns me is that the U.S. Postal Service will find a way to misdirect mail so that it ends up in the wrong E-mail box. This is their trademark with snail mail, so why should it be any different for them with E-mail?

Jeff LeBlanc
Lafayette, La.

Making the grade

The section on Windows NT Server 4.0 in your article "The NOS report card" (Sept. 30, page 40) states: "Because Exchange runs as an NT service, restarting it when you reboot the server is automatic.

That's not the case with Notes, which runs as a console application requiring a system logon."

That is incorrect. Notes can be installed as a service in NT and will restart if the server is rebooted.

Furthermore, it should be emphasized that Windows Internet Name Service to Domain Name Service (DNS) integration is a Microsoft proprietary solution; it does not share with other Berkeley Internet Name Domain implementations as easily as stated.

I haven't tried to zone-list Microsoft out to a Unix DNS, but I'm willing to bet it still isn't an easy proposition.

Scott Hill
Senior systems consultant
InterGlobal Multimedia
Communications Group
Hasbrouck Heights, N.J.

Burned up

Your article "Getting the most out of your firewall platform of choice" (Sept. 30, page 35) was so biased toward Microsoft Corp. that I was surprised there wasn't a Microsoft logo stamped on it. The real killer was your listing as a "disadvantage" of Unix the fact that it "requires familiarity with Unix." Obviously you were running short on disadvantages, but this was truly a reach.

Also, the fact that Windows NT "can easily be integrated into a Windows environment" was the weakest advantage I have ever seen. Isn't that a given? Apparently, the Unix firewalls are not easily integrated into Unix environments, for some unknown reason.

The fact that Windows NT "provides no way to limit unsuccessful logon attempts" pretty much precludes it from being considered a firewall product at all, in my book. What is the point of a firewall if not to prevent unauthorized logons?

What is the point of writing such biased articles? Certainly not to provide information, only propaganda.

Jack Bochsler
San Diego

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Data Communications, September 1996

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* Testing conducted by National Software Testing Laboratories, September, 1996



It's still a frame game

The Network World Broadband Ticker tracks the latest high-speed services. This quarter, frame relay continues to keep the ticker humming.

By Beth Gage and Leslie Lake

Welcome to the third edition of the Broadband Ticker, our synopsis of the most important broadband-related events of the past three months. We put each announcement in perspective and give you the upshot concerning who, if anyone, can benefit.

This quarter showed the usual high level of activity in frame relay, but it was quiet on the ATM and private-line fronts. We had expected a plethora of announcements to sort through after the NetWorld+Interop 96 show in September, but it wasn't to be. Apparently, carriers are getting wise to how such announcements tend to get lost in the hubbub surrounding major shows; expect them to make up for it by the end of the year.

GENERAL EVENTS

Event: The most dramatic announcement of the third quarter was the impending merger of MFS Telecommunications Company, Inc. with LDDS WorldCom. Although the market has seen the consolidation of four of the regional Bell companies, this is the first merger of interexchange and local exchange carriers on a nationwide scale.

Upshot: This merger, planned for its engineering and operational advantages, sets the stage for the resulting company to define new rules in packaging services and delivering business solutions across traditional boundaries. By combining local access and long-distance networks, the resulting company should be able to significantly decrease operating costs. MFS has shown a willingness to market application-based services, a la High-speed LAN Interconnect. In the best case, the emerging company will develop new business-oriented services and be able to offer them at a savings compared with piecemeal solutions from other carriers that still have a large local access charge to pass through. However, the strategic direction of the combined companies and how effectively it will be implemented remain to be seen.

Event: US WEST, Inc. will be expanding its Interprise Networking Services to 33 out-of-region markets by early 1997. The

carrier will initially include frame relay, Transparent LAN Service and Interact, an Internet-based desktop computer networking service for the creation of business-to-business intranets. By the end of the year, US WEST will offer service in 108 metropolitan areas, both in and out of its 14-state region.

Upshot: Companies with their headquarters in US WEST regions and remote locations elsewhere may be able to use a single provider for local services. This could reduce the time required to manage service providers by streamlining the local service network components.

Event: MCI Systemhouse announced networkMCI Management, which provides outsourcing of equipment, network connectivity and management, down to application-level support. The cost of service will average about \$225 per user per month, depending on the size of the contract and the scope of services you select.

Upshot: For smaller networks (50 to 75 desktops), networkMCI Management may be a fairly cost-effective alternative to beefing up your own staff. If you have a larger network, it's probably more cost-effective to add a few top-notch people of your own.

Event: LCI International, Inc. has repackaged and tariffed its Integrity Products, which include a range of voice, video and data services for both long-distance and international networks. The tariff lowers the monthly minimums and includes more aggressive discounts for LCI customers with a minimum monthly volume of \$10,000.

Upshot: New cross-product discounts give LCI customers large savings when choosing LCI as the sole service provider. All the services are included on a single bill.

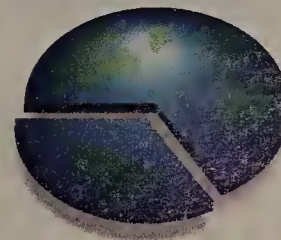
FRAME RELAY

Event: AT&T has completed the upgrade of its frame relay backbone to ATM-based DS-3s. New customers are being provisioned on the network, and AT&T is in the process of migrating installed customers. AT&T plans to have all customers on the backbone by year-end.

Upshot: The new frame relay network supports options such as service interworking with ATM, ISDN dial access and high-speed frame relay, making it easier for you to tailor access and services on a site-by-site basis.

MORE THAN OUR SHARE

The U.S. accounts for more than two-thirds of the worldwide frame relay market.



NNI and service coordination

Event: MCI Communications Corp. is now supporting

Private Network-to-Network Interface (P-NNI) connections — for example, dedicated to one customer — with BellSouth Corp. MCI joins LDDS WorldCom in supporting NNI connections. MCI is in NNI discussions with other major local exchange carriers and plans more announcements later this year.

Upshot: NNI connections can be advantageous if you have several locations within one local access and transport area but also need inter-LATA links to some sites. With NNI, you can establish permanent virtual circuits (PVC) that cross LATAs and are handled on two different carriers' networks. P-NNI connections may be attractive if you are concerned about congestion problems that could occur with

GET THE WHOLE PICTURE

Check out the first two installments of the Broadband Ticker to get the whole story on this year's most important broadband news. We've also established links to sites that will help you bone up on frame relay, ATM and SMDS technologies. Enter the number above in the DocFinder box on the home page.



Network World Fusion
<http://www.nwfusion.com>

public (or shared) NNI connections. Since P-NNIs are dedicated only to one customer, they are more expensive than public NNIs.

SNA over frame relay

Event: Pacific Bell introduced SNA on FasTrak, a package that includes frame relay transport, equipment and network management. Sales promotions for the service include equipment discounts and free installation for customers that currently have private lines with other carriers. Integration, equipment, project coordination and network management are available through Pacific Bell's Network Integration subsidiary.

Upshot: Customers migrating from private lines to frame relay may be able to reduce networking costs significantly. If you are about to undertake a network migration, this is worth considering.

Event: Ameritech Corp.'s Advanced Data Services (AADS) subsidiary announced the availability of SNA Solutions and LAN Solutions. Part of its NETPROphet Managed Services product line, SNA Solutions includes frame relay transport, ISDN dial backup, customer premises equipment (CPE), priority PVC connections, proactive monitoring and repair and Net-Results Performance Reporting. LAN

configuration, as well as measure delay, availability, traffic flows and bottlenecks at several levels, even down to the desktop or by each protocol implemented. These are powerful network management functions that have been lacking. The downside is that you need a Visual Networks Analysis Service Element at each network location to gain the added information.

Event: LDDS WorldCom rolled out Web NMS, a network management service that enables you to get utilization reports in close to real time using Netscape Communications Corp.'s Navigator browser. Customers can retrieve information that is up to 45 days old. Web NMS can show you views of your private-line and/or frame relay networks, or information on your toll-free and other voice services.

Upshot: Customer network management offerings have typically been expensive to implement, requiring a high-powered workstation to retrieve and store data. LDDS takes on a lot of the responsibility by storing the information and providing easy access via the Internet. If you want to keep an eye on your network utilization, check out this service.

Pricing and promotions

Event: Sprint is offering a frame relay promotion that bundles PVC and port charges based on a three-year term commitment. This promotion, officially launched in the second quarter, will continue into the fourth quarter.

Upshot: If your frame relay contract is coming up for renewal, then you might consider comparing the promotional cost with your current monthly recurring

costs for service. But keep in mind that three years is a long time in this business; generally, it's not wise to lock yourself in for that long unless you have got no doubt it's a sweet deal.

Event: Cable & Wireless, Inc. has unbundled its frame relay service pricing, which previously included a DSU/CSU and local access facilities, and is now offering transport-only service.

Upshot: Customers that are considering changing service providers, or that have invested in CPE, can now do an apples-to-apples comparison on service costs. Make sure you are comparing apples, though, and not costs for zero-committed information rate services vs. fixed-CIR PVCs, or simplex PVC pricing vs. duplex.

Event: US WEST has refiled its frame relay tariff with an effective date of Sept. 30. In general, the proposed rates increase fractional T-1 and DS-1 connections. The increase in rates reflects recent network

NETWORK WORLD BROADBAND TICKER ROUNDUP

What's New	Who's Announcing	Who's Been There
Frame Relay		
SNA service	Ameritech	Cable & Wireless, Sprint, CompuServe, MCI, PacBell
ISDN dial access	Bell Atlantic, Cable & Wireless	MCI, Sprint, AT&T
Pricing changes	Cable & Wireless, LCI, US WEST	LDDS WorldCom, AT&T, MCI
Net management enhancements	Sprint, LDDS WorldCom	Not applicable
Pricing promotions	MCI, Sprint	Not applicable
SMDS		
DXI access	Bell Atlantic	
Service cancellation	US WEST	
ATM		
T-1 ATM	Ameritech, PacBell	AT&T, MCI, Sprint, LDDS WorldCom
T-3 ATM	PacBell	AT&T, MCI, LDDS WorldCom, Sprint, US WEST, MFS Datanet
OC-3 ATM	AT&T, PacBell	MCI, Sprint, US WEST, Bell Atlantic
Constant bit rate class of service	PacBell	AT&T, Sprint, MCI, LDDS WorldCom, US WEST, Bell Atlantic
Variable bit rate class of service	PacBell	AT&T, MCI, LDDS WorldCom, Sprint, US WEST, MFS Datanet, Bell Atlantic

Note: PacBell ATM Service is moving from market trial to general availability. The tariff is expected to be approved this month.

upgrades and additions, according to the carrier. There is no price increase for 56K bit/sec connections.

Upshot: Most frame relay locations typically use 56K bit/sec access and are under contract, so they will not be affected by the price change. Also, customers with large networks currently being implemented in phases will maintain the old rates for 24 months. If you have a star network design and only a few locations with fractional port speeds, then private lines may be less costly with the new price positioning.

Event: MCI introduced a sales promotion of one-month free HyperStream Frame Relay service for new customers signing at least a one-year contract and committing to \$500 or more in monthly recurring costs. MCI is also running a "no risk" HyperStream Frame Relay promotion, which guarantees that unsatisfied customers will be reimbursed for charges incurred by switching to MCI's service. The customer is reimbursed for port and PVC installation, monthly recurring costs, local access installation and access coordination charges.

Upshot: The no-risk promotion is fairly typical among frame relay service providers. And unless you're unhappy with your current provider, it's probably not worth switching carriers for the one-month free service.

Dial access

Event: AT&T added ISDN access supporting a native frame relay protocol. This option is available only on the newly installed ATM-based backbone network mentioned earlier.

Upshot: In a new twist on ISDN access to frame, you can now use your router with an ISDN interface to connect to the frame relay network. The main advantage of this is in saving money on the local loop with usage-based ISDN rather than expensive dedicated loops. Of course, your cost sav-

ings will depend on your network usage. It's worth checking out for your low-volume sites.

Event: Bell Atlantic Corp. has successfully completed a trial of ISDN dial access to its frame relay service.

Upshot: Don't rush out and try to order it yet. Bell Atlantic is still fine-tuning the option, and general availability is scheduled for the fourth quarter.

Event: BellSouth announced an access option to its Frame Relay and Connectionless Data Service (for example, Switched Multimegabit Data Service) that is based on 2B1Q (2 Bit 1 Quaternary), the ISDN signaling standard.

Upshot: An option that no other service provider has announced, this feature will enable customers to increase the frame relay/SMDS rates up to 128K bit/sec on a two-wire local loop, which is normally set at 56K/64K bit/sec. This could lower costs on upgrading network locations that have outgrown 56K bit/sec connections by saving on access equipment and higher cost local access circuits.

High-speed frame relay

Event: Bell Atlantic has completed testing of its high-speed frame relay ports and is beginning to offer them on a limited basis.

Upshot: If you are hitting that 1.5M bit/sec ceiling, this is a more straightforward solution than adding a second frame relay port or trying service interworking with ATM.

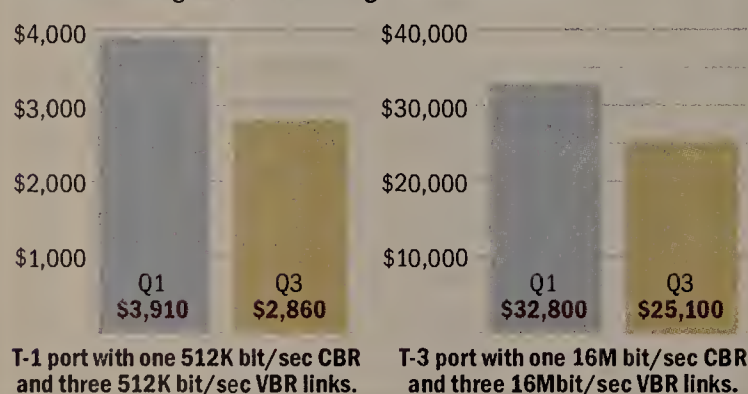
SMDS

Event: Bell Atlantic has added lower speed access options to its SMDS service, with speeds from 56K up to 1.5M bit/sec.

Upshot: SMDS networks are easier to design than frame relay networks. For one thing, you don't have to define PVCs or CIRs. And any-to-any connectivity be-

ATM PRICING: ON THE WAY DOWN AT LAST?

Prices are averages for Interexchange carriers in 1996.



Solutions includes managed support for Fast Ethernet, Fast Token Ring and ATM LANs using Ameritech's Frame Relay, Connectionless Broadband Data Service or ATM Service for the transport.

Upshot: Packaged offerings that include equipment, transport and management can help ease networking burdens by reducing the number of components you have to manage day-to-day. SNA Solutions is unique among such packages in that it supports priority PVCs for the SNA connections, helping to ensure SNA gets the bandwidth it needs.

Network management

Event: Sprint Corp. announced a strategic relationship with Visual Networks, under which Sprint will offer a Visual UpTime Analysis Service Element and DSU/CSU with an embedded customer network management capability.

Upshot: Sprint Frame Relay customers opting for the Visual UpTime arrangement will be able to verify their network

tween all your network locations is automatic with SMDS. With address screening and filtering, it's also easy to establish interenterprise networks using SMDS. If you want to set up a network that can support secure communication between several groups (such as customers, distributors and suppliers), check this option out.

Event: US WEST is no longer offering SMDS service, having canceled it due to lack of customer demand. Even though SMDS is a great technology, it has been the red-head stepchild of telecommunications. The SMDS tariff has been removed from all but one state in US WEST's 14-state region.

Upshot: Most customers have already migrated to the carrier's frame relay or ATM service. If you are looking for an interenterprise solution, which SMDS was well suited for, you should check out IP services, Notes services, or try to fit frame relay with security options to your application.

ATM

Event: Pacific Bell is filing a new ATM tariff. Subject to approval, the tariff will out-

GOING THE WEB WAY

Web-based customer network management is a growing trend. LDDS WorldCom, for example, has added a Web-based product to its existing palette of net management services. Expect to hear more of the same from other carriers in the months ahead.

line Pacific Bell's FasTrak ATM Service for low-speed access, incremental speeds and service guarantees.

Access rates are offered as low as 64K bit/sec and extend in various increments up to 148M bit/sec. Service includes support for constant and variable bit rate traffic types, as well as some basic service guarantees.

Upshot: Although commercial availability means higher service prices, it also means service delivery should be under control. If you are in Pacific Bell's area, ATM service may be a cost-effective alternative to large, intra-LATA private-line networks. With the wide range of access rates, even your low-speed sites can be supported on the same network as your high-speed locations.

Event: Ameritech announced general availability of its ATM service at T-1 speeds.

Upshot: T-1 ATM gives you the option of having a homogeneous network (for example, all ATM) rather than going the service interworking route with frame relay. If you are installing a new network and are not currently using frame relay, and you expect the network to grow rapidly, then start with T-1 ATM at the smaller network locations.

Looking ahead

What's coming down the pike? Expect still more frame relay announcements as service providers continue to roll out dial access, high-speed frame relay and SNA migration packages.

ATM services seem to have stalled, but we expect them to pick up a bit with the

close of the year. Next time, we will also look at how service prices have changed since the beginning of the year and revisit the positioning charts that were included in the first Broadband Ticker installment (NW, April 1, page 79).

So stay tuned for the latest in broadband news.

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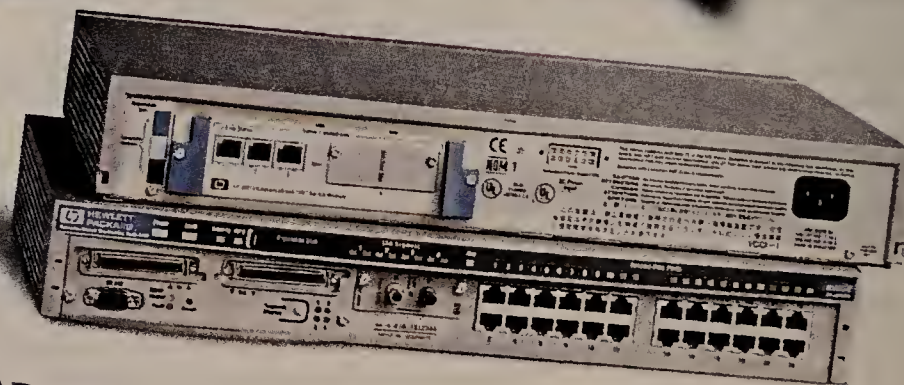
WIRING CLOSET

518

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See ya, Sam



ADVANCESTACK 10BASE-T SWITCHING HUB

Branch office routers tame remote links

Bay tops roundup of routers that help you master remote office connectivity.

By Edwin E. Mier, Robert Smithers Jr. and Roy Mesker



While high-end routers are the lions of networking, branch office routers are the lynx that keep businesses connected. And while it might be easier to train some of them to jump through hoops than to configure them, they offer a range of capabilities that belie their small size and price.

For this review, we focused on routers supporting a single Ethernet LAN, a high-speed synchronous serial interface, another serial interface for dial backup, and IP and IPX routing. The best of the bunch in these tests was the \$1,795 BayStack Access Node (AN) from Bay Networks, Inc. Its top performance, relatively uncomplicated configuration options and broad connectivity features lifted it above the crowd.

We also looked at:

■ Cisco Systems, Inc.'s 2501, a good performer under IP

but a difficult box to configure.

■ RAD Network Devices' Open Gate OG C2, a four-slot device that was the only fully modular router of the bunch.

■ RNS's NetHopper NH-Sync+, which was severely limited by its inability to perform at above 112K bit/sec.

■ 3Com Corp.'s SuperStack II NetBuilder 227, a feature-rich router with built-in firewall functions.

We contacted numerous other vendors, including Hewlett-Packard Co., IBM, Proteon, Inc., Telebit Corp. and Xyplex, Inc., which either didn't respond, declined,

responded too late to be included or sent models that didn't meet the remote office router configuration we specified.

Bit movers

One of the most significant differences between these remote-office routers turned out to be performance — that is, their ability to deliver compressible users'

data across their serial WAN link.

We found that, under certain circumstances, such as with compression-enabled and compressible user data, one router's throughput could be more than double another's.

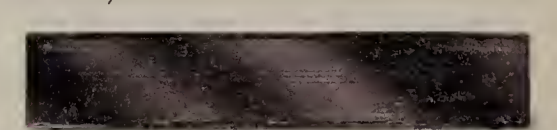
In other cases, such as without compression, throughputs can be nearly the same. This presumes the branch-office router can operate at, and push through enough packets to make efficient use of, the synchronous link speed you plan to use. But we found that's not always the case.

We conducted our serial/WAN throughput tests over a full-duplex 256K bit/sec digital leased line. The RNS NetHopper NH-SYNC+ proved to be the only router tested that couldn't handle the 256K bit/sec link speed. It wasn't until we throttled down to 112K bit/sec that the router could successfully maintain the link.

As it turned out, this model of the NetHopper can deliver only about 64K bit/sec over a synchronous, serial WAN link. As a result, this router's performance was only about one-fourth of the others, all of which could fully load their 256K bit/sec link. RNS said it had another model with better throughput — and a higher price tag. However, time didn't permit a retest. What's more, there's no clearly stated throughput or link-speed limit for the router model that was tested.

We found that compression makes a big difference. We transferred a 3M-byte file to test throughput. With compression disabled, the time it took each router to complete the transfer was nearly the same (see graphic, page 54).

The 3M-byte file we used was mostly highly compressible text, so with compression turned on, things moved quite a bit faster. There were two exceptions: RAD's Open Gate doesn't support compression; and regrettably for Cisco, we were unsuccessful in configuring the 2501 routers for IPX compression, even after spending hours with the vendor's telephone support staff trying every configuration setting they could think of. (IPX compression is not addressed anywhere in Cisco's documentation for the 2501 router.)



Bay Networks' BayStack Access Node

To gauge each router's ability to load the synchronous WAN link, we applied a Wandel & Goltermann, Inc. test called RT Bench, which is run on W&G's DA-30cz analyzer. In RT Bench, a unidirectional stream of 64-byte IP packets is passed at increasingly higher rates until packets begin to be lost by the routers. We tried this test with compression both on and off for the devices that supported it.

The breaking point came quickly for RNS's NetHopper. We saw an equivalent data throughput of just 38K bit/sec before data began to be dropped.

Oddly, the 3Com NetBuilder did better without compression, achieving a 282K bit/sec throughput before data loss occurred. With compression, the throughput dropped to 200K bit/sec.

Cisco and RAD tied in this round, each achieving a 247K bit/sec throughput

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ScoreCard

	BayStack Access Node	Cisco 2501	RAD Open Gate OG C2	RNS NetHopper NH-Sync+	3Com SuperStack II NetBuilder 227
Overall	8.6	8.1	5.7	4.8	7.1
Performance (20%)	10	8	4	2	7
Management and administration (20%)	9	9	5	4	8
Networking and connectivity (15%)	8	8	6	4	8
Special/advanced features (15%)	9	8	5	6	8
Ease of use and documentation (15%)	8	8	7	6	5
Installation and configuration (15%)	7	7	8	8	6

Scores based on a scale of 1-10. Categories are weighted by the percentages shown.

NetResults

Product	Product	Product	Product	Product
BayStack Access Node (AN), running AN Remote Office software, Version 10.01, Rev B	Access 2501 Ethernet/dual serial router, running Release 11.1(5) IOS IP/IPX router software	Open Gate OG C2, running Open Gate router software Version 5.5	NetHopper NH-Sync+ router, running Version 4.2 router software	SuperStack II NetBuilder Model 227, running software Version 9.1
Vendor: Bay Networks, Inc. (800) 822-9638 www.baynetworks.com	Vendor: Cisco Systems, Inc. (800) 553-6387, (408) 526-4000 www.cisco.com	Vendor: RAD Network Devices (201) 529-1100 www.rad.co.il	Vendor: RNS (800) 262-8023, (805) 562-3173 www.rns.com	Vendor: 3Com Corp. (408) 764-5000 www.3com.com
Price: \$2,195 for IP, WAN protocols, bandwidth management, IPX, AppleTalk and SNA integration (including Data Link Switching).	Price: \$3,395 including 4M bytes DRAM, special WAN/serial cable and IOS IP/IPX feature set software.	Price: \$1,611, including software; \$90 for WAN/serial cable.	Price: \$2,195, including an integral V.34 modem and routing software.	Price: \$3,695 for router with software.
Pros: ▲ Best link performance for Novell NetWare-type file transfers over serial link using IPX routing and vendor's compression ▲ Ships with useful Windows- and IP-based configuration utilities ▲ Excellent on-line help, including assistance for setup of dial backup ▲ Can save many different configurations, with very good file management via Site Manager application	Pros: ▲ Best compressed IP file transfer performance over serial link using IP routing ▲ Router can be configured as an IP-to-IPX gateway via IPExchange software feature ▲ System software includes an integral Web server feature for management access via Web browsers	Pros: ▲ Fastest and easiest to configure via command-line console ▲ Helpful quick-configuration guide ▲ Supports router redundancy, where a standby router on the LAN can take over for a failed router, assuming its default-gateway IP address ▲ Modular chassis offers four slots for user configuration flexibility	Pros: ▲ Easiest set up for dial backup; router includes integral V.34 modem (in addition to synchronous serial link interface) ▲ Broad support for dial-up security protocols and features (PAP and CHAP authentication, RADIUS and SecurID) ▲ Nice console interface; generally easy to configure	Pros: ▲ Good built-in firewall features ▲ User can select from among various types of link compression ▲ Rich in advanced features and functionality, including bandwidth on demand and load sharing across the synchronous and dial-up links
Cons: ▼ Default setup for initial configuration, via BOOTP network download, is tedious to disable ▼ Compression can't be enabled on an existing link; a complete reconfiguration of the link is required ▼ Some problems using certain — otherwise valid — IPX network addresses	Cons: ▼ Requires a high level of expertise to configure ▼ IPX setup was troublesome, especially IPX SAP filtering and IPX compression ▼ No special integral firewall features	Cons: ▼ No compression ▼ Router doesn't support telnet remote-console access ▼ No special, integral firewall features	Cons: ▼ Limited throughput: synchronous serial link does not operate above about 112K bit/sec ▼ Doesn't support bridging	Cons: ▼ Compression performance below average ▼ Command-line interface is cumbersome, complicated and unforgiving ▼ Default settings for some protocols, including NETBIOS-over-IP and IPX routing, exhibited problems, or didn't work and had to be reconfigured

before data began to be lost. Bay's AN was tops with an incredible 526K bit/sec before it began dropping packets.

We also checked these remote-office routers for interoperability with a de facto standard backbone router. For this purpose, Cisco Systems, Inc. loaned us one of its high-end 7000 routers, running Release 11.1 software.

Given the diverse set of protocols supported by the different remote-office routers, we settled for a fairly basic interoperability environment that all of the routers supported — IP routing using the Routing Information Protocol. All of the routers interoperated with the Cisco 7000 without a hitch.

While we didn't explicitly test each router's dial backup facilities, we did find

some differences in setting them up. For example, Cisco's was nightmarishly difficult to configure properly, while others, such as RNS's NetHopper, were virtually automatic.



Cisco's 2501

Setting up is hard to do

To get the best performance, you must first configure your routers properly. Configuring routers has long been the bane of network managers. This is compounded by the fact that no two vendors' routers are configured the same way.

We evaluated all of the vendors' tools, documentation, and written and on-screen help, and came up with a relative "level-of-difficulty" ranking. On the Mier scale of difficulty, where 10 represents the technical proficiency of a network guru and 1 a gorilla, here's the skill level requirements for the five routers tested: 5 for RAD; 6 for RNS; 7 for Bay; 7.5 for 3Com, whose documentation is the vendor's only saving grace; and 8 for Cisco, which, all things considered, is darn tough to get up and running.

Note that no vendor gets a "level of dif-

ficulty" rating below 5. Generally speaking, routers are hard to set up, and that's one of the leading reasons many users are finding link-layer switching as the more appealing internetworking technology.

We should note that all the routers tested also support network download of their configuration and program load via the BOOTP protocol. This doesn't necessarily make setup any easier, however; it just means that much of this can be done from a central site.

Both the menu-based and raw command-line modes of 3Com's configuration utility are nonintuitive, tedious and poorly thought out — by far the worst of the bunch. And unfortunately, 3Com doesn't offer a graphical utility for configuration.

The easiest command-line setup was RAD's, followed closely by RNS'. Both RNS and RAD also offer PC-based utilities, which offer an alternative to their console interfaces for basic configuration. Configuring dial backup on the RNS was especially easy, in part because the NetHopper includes an integral V.34 modem. The setup of dial backup on the others ranged from difficult to nearly impossible.

Both Cisco's and Bay's command lines take some getting used to, but both also offer Windows programs that make the task a lot easier. Bay actually offers two — its Quick2Config utility, plus its aging

Site Manager.

Feature set

Users shopping for a branch-office router should read the fine print carefully before signing on the dotted line. It has become stylish in the router marketplace to unbundle software features. Some,

FILE TRANSFER TIMES

Vendor	No compression		With compression	
	IP	IPX	IP	IPX
Bay	110	109	60	60
Cisco	109	108	56	(1)
RAD	110	108	(2)	(2)
RNS (3)	515	340	449	296
3Com	111	107	81	90

(1) IPX compression could not be configured.
(2) Compression not supported; throughput same as without compression.
(3) Max. sync link speed supported was 112K bit/sec; all others tested over a 256K bit/sec link.

such as routing support for specific protocols, may be offered by a vendor only if you buy the optional premium software offered for the router. And some features included in the base product of one vendor's router may be extra-priced options with another's.

The bundle each vendor sent to us was the software we tested and is included in our pricing information. All the vendors

For a look at our recent low-end router Buyers Guide, enter this number in the DocFinder box on the home page.



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had to provide IP and IPX routing to participate in this round of testing. But each vendor offers other key features:

■ **Bay:** Routing software for DECnet, AppleTalk and Banyan VINES, plus bridging and two types of compression, as well as support for a hot-standby router



RNS's NetHopper NH-Sync+

backup capability, load sharing and bandwidth-on-demand operation across multiple WAN links.

■ **Cisco:** Support for bridging, one type of compression and IPX-to-IP gateway software, as well as load sharing and bandwidth-on-demand operation across multiple WAN links.

■ **RAD:** Routing software for DECnet and

SNA, plus bridging, and support for a hot-standby router backup capability, load sharing and bandwidth-on-demand operation across multiple WAN links. A major drawback to RAD's performance, though, was the absence of any data compression. The vendor plans to add data compression in an upcoming release.

■ **RNS:** No additional routing protocols and no support for bridging. One type of data compression is supported.

■ **3Com:** No additional routing protocols but support for bridging, three types of data compression, and load sharing and bandwidth-on-demand operations across multiple WAN links.

These are some of the key differences in supported features between the versions of the router models tested, but it is by no means an all-inclusive feature listing. In some cases, such as integral firewall features, which all vendors but RAD claim to provide, we found it is really a question of degree. In our view, 3Com's NetBuilder 227 and, to a lesser degree, RNS's NetHopper NH-Sync+ have above-average firewall features.

HOW WE DID IT

We tested five low-end routers designed to connect small to midsize sites, such as branch offices, over a synchronous WAN link to a backbone network.

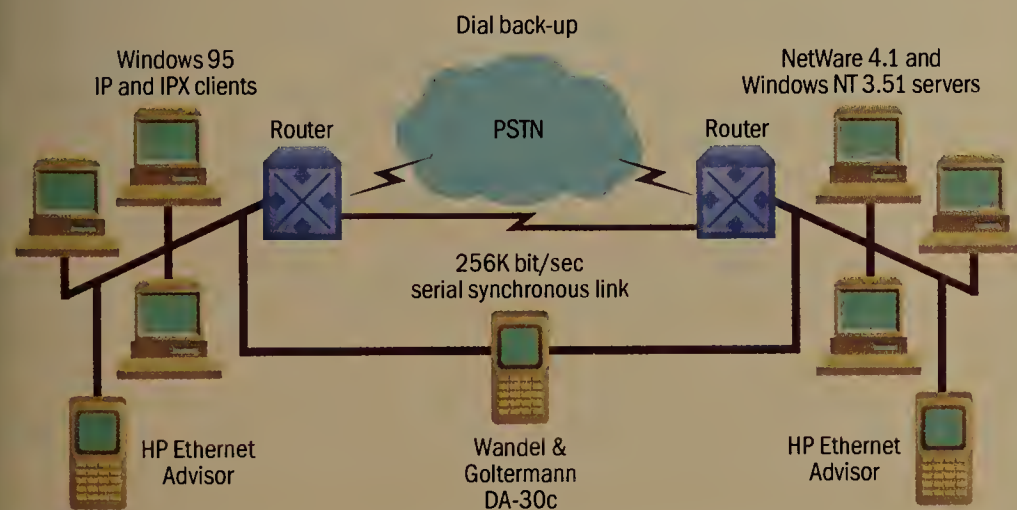
To be included in this evaluation, each router had to support IP and IPX routing; at least one Ethernet LAN connection; a serial synchronous WAN link, with the cabling necessary to provide a V.35 interface; and a secondary serial interface for dial backup via analog modem. Each vendor submitted two routers so we could test throughput performance, which invariably employs a vendor's proprietary compression methods (see diagram).

For throughput measurement, we configured each vendor's routers for IP and IPX routing, and linked them directly via a special "modem eliminator" device, which simulates a V.35-based, synchronous, dedicated digital link. This link was configured to operate at a full-duplex 256K bit/sec rate.

We tested each vendor's routers using both IP and IPX, with compression both turned off and on, by transferring a highly compressible 3M-byte text file.

Next we ran a special test, called RT Bench, between the networks over the interconnected routers. In this test, synchronized Wandel & Goltermann DA-30c analyzers issue a stream of minimum-size, 64-byte IP packets in one direction. The packet-delivery volume is then automatically increased incrementally by the DA-30c analyzer, to the point where packets begin to be lost. The effective data rate at that point is then calculated.

Since this test uses unidirectional transfer of the same minimum-size IP packet, it does not reflect the variable traffic flows and volumes found in most user environments. However, it is useful for deriving a generalized comparative metric for maximum packets per second and data throughput between routers, with compression enabled, over a 256K bit/sec link.



Remote office speed limit

What is a typical link speed for connecting a remote-office router to an organization's backbone network? In our testing of low-end routers, we decided to compare performance and throughput using a full-duplex, 256K bit/sec dedicated digital channel.

At speeds of up to 128K bit/sec, ISDN may be an alternative to a dedicated digital channel. However, unlike in a telecommuter-at-home setting, most remote-office environments need full-time connectivity or, at a minimum, near-continuous connectivity through the 9-to-5 workday.

ISDN equipment that supports what is called inverse multiplexing can aggregate multiple 64K bit/sec ISDN B channels into a single virtual high-speed digital channel. Many ISDN adapters support this by allowing users to aggregate the two ISDN B channels into a 128K bit/sec digital stream. A few others let users combine B channels from multiple Basic Rate Interface services into even higher speed links, such as 256K or even 384K bit/sec.

However, because ISDN is inherently a switched service, it is viable in the remote-office-to-backbone environment only where the remote office is relatively close to the backbone network access point (within the same local access and transport area) and where local ISDN service doesn't involve additional message-unit charges for connect time. Otherwise, the cost for using ISDN to connect a remote office on a full-time or near full-time basis can end

up being much more than a full-time, dedicated digital channel.

In the final analysis, the correct bandwidth of a remote-office link depends on many factors: the number of users on the remote-office LAN that are likely to connect to the backbone concurrently; the characteristics of applications they will use, such as whether they're transactional or involve heavy file transfers; and the protocol or protocols used.

Frame relay is an increasingly popular option for linking an organization's remote offices with its backbone or central location. Access to the frame relay service is via leased line in most cases.

However, just because a router includes a synchronous serial interface doesn't necessarily mean that it also includes software support for frame relay; you may have to pay extra for it. On the other hand, most basic router packages do include software support for PPP over their synchronous serial links.

Another note on serial interfaces: A router that provides a synchronous serial interface for WAN connectivity is not readily able to connect to ISDN. You need special equipment (and also special software). And most low-end, fixed-configuration routers that sport a synchronous serial interface will not be upgradable for ISDN connectivity. Many vendors instead offer low-end router models specifically designed for ISDN.

—Edwin Mier, Robert Smithers Jr. and Roy Mesker



3Com's NetBuilder 227 family

Management and administration features are also present in different degrees. For example, all the routers tested include extensive SNMP support, although it is more extensive in Bay's AN and Cisco's 2501 than in the others. Bay and Cisco offer the most diverse set of management features and capabilities, including separate, extra-priced management applications. Indeed, Cisco now has a Web server built into its router software, enabling users to access a slightly dressed-up HTML version of the Cisco router command-line interface from anywhere on the Web via a browser.

3Com's management capabilities aren't far behind, although some useful things supported by Cisco and Bay, such as the ability to log event messages to a Unix syslog server, aren't supported to the same extent.

The management aspects and features of RNS' NH-Sync+ and RAD's Open Gate aren't as well developed. In fact, Open Gate is the only router we tested that

doesn't support telnet remote-console access.

Wrapping it up

Performance is a significant factor for most users. Based on our tests, Bay was the best overall performer of the five routers.

Configuring any of these routers requires a moderate level of networking expertise. Bay's middle-of-the-road ranking in this respect represents a fairly good balance between capability and complexity. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 47.



Mier is president of Mier Communications, Inc., a network consultancy and product test center based in Princeton Junction, N.J. Smithers is manager of test services and Mesker is lab test coordinator at Mier Communications. They can be reached via E-mail at ed@mier.com, robs@mier.com and roym@mier.com.

FPL

Continued from page 1

switch and circuit installations have gone as planned. But training for the new ATM technology has been taxing, and the learning curve for installations is now apparent.

"You read story after story about ATM and you see a picture of an ATM device tied to a cloud, and another device on the other end," says Rick Carpani, senior telecommunications analyst in Florida Power & Light Co.'s (FPL) Telecommunications & Technology unit. "You just connect this ATM switch up to the cloud, and what goes in one end comes out the other. Well, it's just not that simple."

Dave Fernandez, another senior telecommunications analyst, says, "Once you have everything up, there's still the fine-tuning that has to be done. And there's a lot of fine-tuning with ATM."

Nonetheless, FPL has persevered. The ATM net is on schedule to go production by year-end in FPL's Power Delivery Systems business unit.

Decision point

When we visited with FPL last June (NW, June 10, page 1), the company had just completed its request for proposal

voice services. The other two slots house command processors that coordinate activity on the switches.

The Magellan line's scalability also was a factor, according to Pina. Nortel offers a five-slot chassis with a single command processor and room for four service modules. And, there have been hints about smaller models, as well, which would be attractive for branch offices.

Nortel's voice capabilities proved to be a deciding factor for FPL. Passport can read PBX signaling protocols to route individual calls directly, rather than have them pass through a tandem PBX switch.

"Nortel was the best choice for us, but the other vendors have excellent products, too, and they may be a better choice for other companies," Pina says. "You've really got to do your own homework."

Road trip

One of the most important moves that FPL made after identifying its switch supplier was to visit Nortel's lab facilities. There, FPL tested Passport's prioritization, rerouting, traffic management, voice and silence compression, throughput, various traffic mixes, and congestion control.

The switch passed every test. In addition, FPL insisted on picking the brains of

existing switch customers, which is when it first learned about the complexity of switch setup.

But FPL's examination did not end there. Following the vendor site visits, FPL invited Nortel to its Miami headquarters to evaluate how well Magellan switches would interoperate with existing FPL network gear.

The utility's engineers attached the Magellan to a T-1 loop running from Miami to Sarasota, Fla. over FPL's private SONET network and put the switch through a battery of tests. FPL deliberately killed a node to see

how switches would fare with a service interruption. Further, FPL engineers tried overtaxing the switch by flooding it with LAN traffic to learn what impact that would have on voice flows. Later, the engineers assigned voice traffic a higher priority and watched how the switch throttled back other traffic.

Fernandez says the exercises were telling. For example, it took Nortel's own engineers two days to configure the switch for a single T-1 loop. "Even [Nortel's] own guys had a hard time establishing the switch options and doing all the provisioning setups," he says. "It gave us an inkling of what was to come."

Project pointers

FPL nonetheless stuck by the decision to go with Passport. It cut purchase orders in late June, and switches trickled in through July. In August, site preparation

was the top priority — ensuring adequate power supply, installing battery backup and creating cabling and termination facilities in addition to physical switch installation.

In tandem with site preparation, FPL pulled the DS-3 circuits off of its statewide SONET ring that would form the ATM backbone. The actual connection of the

"We've learned a lot the first time out. Even though the learning curve has been very steep, we've got a good handle on this now."

Dave Fernandez,
FPL senior
telecommunications
analyst



DS-3s to the Magellan switches went smoothly, Fernandez says. "The Magellans accepted the feed, recognized them as DS-3s and started to send traffic between switches, talking to one another to recognize routes," he says. In all, it took about a week and a half for FPL's ATM team to bring up the switches.

Currently, the team is provisioning local T-1 links that stretch from each switch to various power substations, which, in turn, generate measurement data that has to be shipped back to Miami. Those circuits will be installed and tested the rest of this month and into November.

Very fine-tuning

With the switches up and running, Carpani and Fernandez now are entrenched in the most laborious aspect of the ATM project: spending countless hours fine-tuning the switches.

"I've never dealt with a product like this where there are so many settings," Carpani says. "I've spent weeks now just trying to understand all of the attribute settings for circuit emulation and transparent data service — that's not including other services we may decide to use later, like voice or LAN emulation. It's just a very detailed process."

This fine-tuning goes well beyond broad definitions of class of service. Initially, for instance, FPL will mostly perform circuit emulation over its ATM net. But once you identify circuit emulation as the class of service, you must then detail whether you want it to be frame aligned or nonaligned — meaning keeping 24 T-1 channels as a group or splitting them up.

Further, you must make sure the data ingress and egress assignments check out, and since FPL is using channel banks in its Miami data center, Carpani says the switches need to preserve time-slot settings. You may even be required to set attributes on a per-port basis and indicate whether the service may be assigned interrupt priority or cell-loss properties.

On another plane, Magellan Passports come configured with preloaded soft-

ware. But because each switch rack can house dual command processor (CP) boards and as many as 14 function processor (FP) cards, you have to download the software to each CP and FP, Carpani says. And you set attributes for both the backbone side of the switch and for the local connections.

Plus, Carpani adds, those configurations have some interdependencies. For instance, if you have a spare FP card designed to take over in the event of a failure, the software must be configured to roll over to the backup card while keeping the various predefined parameters intact.

"It's just one wave of parameters after another," Fernandez adds.

But Carpani recognizes the detailed configuration is what makes ATM so advantageous. "This is the reason we're doing ATM; it gives you greater control."

Almost home

During the next month and a half, FPL will complete the circuit burn-in and testing of T-1 links from the ATM switches to Power Delivery's substations and other sites. FPL engineers will spend a good deal of time ensuring that local telephone companies are providing physical path diversity for the T-1s from their central offices to the FPL switches.

FPL will begin scenario testing with Power Delivery, throwing failure scenarios at the network to understand how it responds.

"We want to make 100% sure we test every contingency before we turn the network over to the customer," Carpani says. FPL's Power Delivery engineers will have about a month to experiment with the setup and work out any kinks.

The ATM project is now heading into its final phase. Once the project is completed, we'll report back with a post mortem of the cutover, discuss lessons FPL

FPL's ATM PROJECT TIMETABLE

Stage	Start date	Completion date
Pre-engineering	8/11/95	1/29/96
RFP review and selection process	1/31/96	5/31/96
Authorization	6/3/96	7/1/96
Equipment order and shipping	6/20/96	7/31/96
DS-3 order	8/2/96	9/5/96
Site-detail engineering	8/2/96	8/29/96
Switch attribute and provision setting	8/2/96	8/30/96
Training	7/15/96	10/21/96
Hardware/software installation	8/2/96	9/3/96
Commissioning equipment	8/2/96	10/11/96
Testing and acceptance of ATM	8/28/96	9/11/96
Circuit installation and burn-in	8/14/96	11/14/96
DS-1 customer circuit cutover	10/1/96	11/18/96
Payment process	10/1/96	12/27/96

SOURCE: FLORIDA POWER & LIGHT, MIAMI

(RFP) process and was mum about its ATM switch choice. Earlier this month, Northern Telecom, Inc. made official what FPL insiders had known for months: The utility had opted for Nortel's Magellan Passport over a number of other ATM switch offerings.

Chief among its criteria was that the switch support a broad array of services such as frame relay, FDDI and other legacy transports. "ATM by itself doesn't do much today, so we wanted a device that would bridge ATM to our existing Ethernet, router and voice networks," says Humberto Pina, the senior telecommunications analyst largely responsible for the RFP process.

Moreover, FPL was drawn to the flexible design of the Magellan Passport Model 160. It is based on a chassis with 16 slots, 14 of which can be used for function processors that support various data and

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Check out the first installment of this series on Network World Fusion, along with technical details of Nortel's Magellan Passport line of ATM switches. Enter the number to right in the DocFinder box on the home page.

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learned and provide final advice on tackling an ATM conversion.

"The next challenge will be taking what we've learned here and applying it in a more efficient manner to the expansion of services we can offer on the ATM network," including video, voice and LAN interconnection, Fernandez says. "We've learned a lot the first time out. Even though the learning curve has been very steep, we've got a good handle on this now." ■

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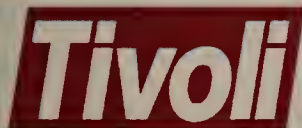
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Briefs

■ **Decision Drivers, Inc.** is shipping software that will help you analyze and select key network products.

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The cost for a one-year license ranges from \$8,000 to \$35,000.

Decision Drivers: (203) 316-6046.

■ **Lotus Development Corp.** will begin offering **Introduction to Courseware Development in LearningSpace and Teaching in LearningSpace** courses early next month. These courses will help developers and teachers effectively implement and utilize LearningSpace, the Lotus Notes-based software for creating and distributing collaborative distance-learning courses (NW, Oct. 14, page 70).

Each course costs \$500.

Lotus: (800) 346-6409.

■ **MicroMedium, Inc.** next month will ship its **Digital Trainer Professional 3.60** multimedia computer-based training software.

The package lets you add multimedia to existing training programs. The new version will allow for distribution and performance tracking of these courses across the Internet and company intranets.

The Windows 95-, 3.1- or NT-based product works with most any Internet browser and costs \$279.95. A version that includes performance tracking costs \$975.95.

MicroMedium: (919) 303-6022.

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Reorganizing gives one CIO a leaner staff with centralized knowledge and distributed talent.

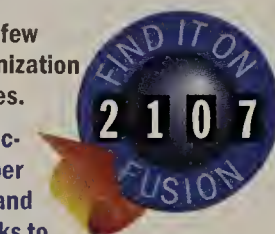
By Lenny Liebmann

When you snip lines from the organizational chart the way Dan Vantucci has, you, too, may be able to upgrade staff skills and save your company millions of dollars in the process.

The chief information officer at ITT Fluid Technology Corp. (FTC) in Midland Park, N.J., a \$1.25 billion ITT Industries subsidiary that manufactures and markets industrial pumps and controls at 100 locations worldwide, detached the technical staff from each of the firm's many business units and brought them under the corporate umbrella. This paved the way to reduce staff from 206 to 176 by eliminating positions that required duplicate skill sets, while aggressively modernizing the firm's network.

Check out a few staff reorganization case histories.

Enter the Doc-Finder number at the right and you'll get links to papers that detail how the University of Wisconsin at Madison's Division of Information Technology was overhauled. Also learn how the University of California at Davis' College of Letters and Science reorganized its teaching staff.



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The move was also the linchpin for a program Vantucci called "Centers of Excellence." Under the program, staff members at various locations became companywide experts in specific technologies while retaining responsibility for performing local functions such as LAN administration. Staff anywhere in FTC can now call on these experts, whereas, in the past, each site was on its own.

By casting employees in this double role, Vantucci says he has found the ideal balance between the efficiency of centralized resources and the "high touch" relationships that are only possible when technical staffers stay in

business units.

It's a balance the company needed. When Vantucci came from Xerox Corp. in 1991, FTC had little centralized control of information technology. In fact, the company was formed through acquisitions, which gave it a multitude of computing environments. FTC continues to operate the acquired organizations as separate business units rather than group them under a corporate name and risk losing brand identities in the markets each serves.

The plan

Even though each unit operates independently, FTC decided to have each conform to enterprisewide technology standards and to integrate the data they use. Headquarters also helped managers running these units understand what the technology could do for them. This required an upgrade in staff skills.

To pull it off, Vantucci restructured the IS staff so that all technology decisions would be centralized, a local IS presence would remain at each location and technical expertise would be shared between business units.

The restructuring was also at the core of the Centers of Excellence program. The ability to share technical expertise across FTC's numerous locations was facilitated by the very thing Centers of Excellence staffers helped build: a standardized, enterprisewide network of Novell, Inc. NetWare LANs, Microsoft Corp. Windows clients, IBM Application System/400 application servers and a frame relay WAN.

Besides assisting staffers in other business units as needed, the enterprise experts help corporate IS evaluate its long-term strategic direction.

"Now if you're having a problem with E-mail, you can go to the E-mail expert and use that person's skills to resolve the problem," Vantucci says.

Furthermore, Centers of Excellence staffers are more valuable to the company because they're able to do more than

mere housekeeping chores, he says.

"The idea is not to have simple maintenance programmers and computer operators on staff," Vantucci says. "You want



ITT Fluid Technology Corp.'s Vantucci distributes technical expertise enterprisewide.

development programmers and infrastructure experts. By changing the whole mix, I predicted that we could save the company a substantial amount of money."

The results

That is just what he did. "It turns out that we're now saving the company over \$1 million a year in IS resources alone," Vantucci says.

Rollout of the Centers of Excellence project took time because transitioning from a structure completely driven by the business units to one that was efficiently distributed across the corporation had to be implemented gradually. But one by one, Vantucci was able to form enterprisewide centers for key disciplines such as desktop support, LAN administration, E-mail and the proprietary software that FTC uses to run its core

business processes.

As new technologies such as intranets become important, FTC will respond by creating new Centers of Excellence.

"We've successfully achieved the vision," Vantucci says. "We have an infrastructure that can move information around the world, and we can manage it with the people we have in place."

To illustrate the success of the

Centers of Excellence concept, Vantucci relates an incident in which a project in Cincinnati encountered a software configuration problem.

As soon as the problem arose, the project team contacted the people with the necessary expertise. The two teams collaborated via phones and computers from their base locations.

"Six people worked on that problem," Vantucci says. "They were in Morton Grove, Ill., Chicago, Lancaster, Pa., Rochester, Minn., and Hoddesdon in the U.K. The only person who ever had to travel was the IBM employee from Rochester."

Liebmann is a consultant and writer in Highlands, N.J., who specializes in networking technologies. He can be reached via the Internet at LL@interserv.com or phone at (908) 872-8500.

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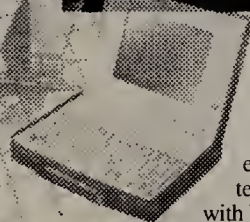
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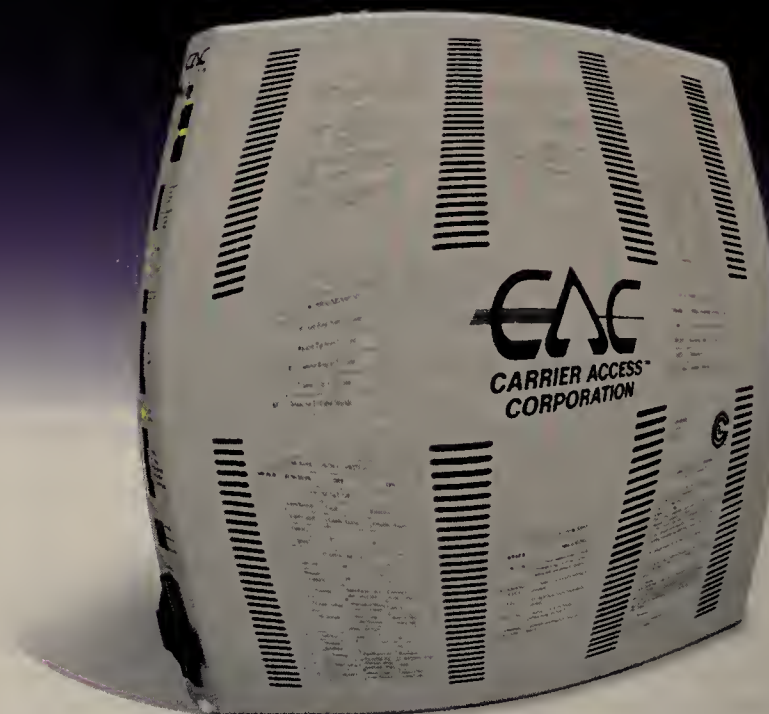
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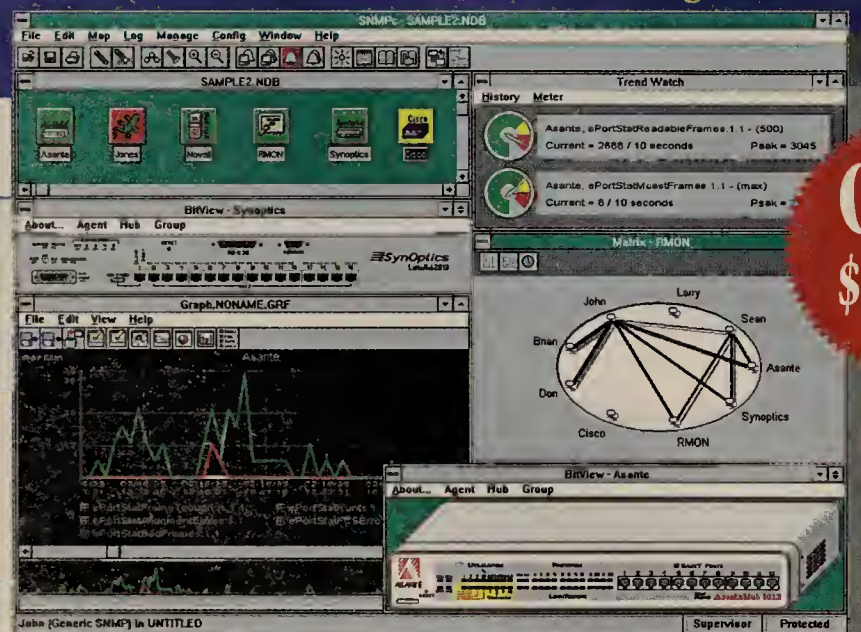
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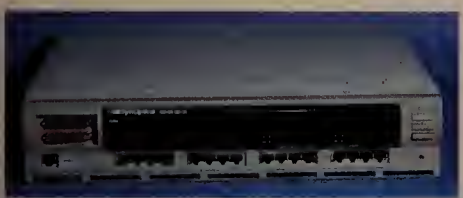
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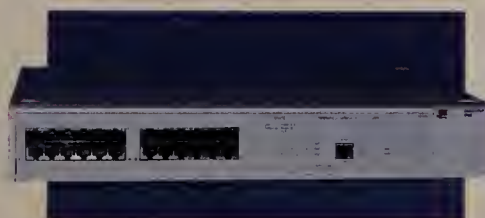


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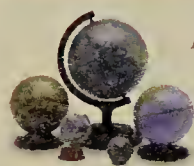
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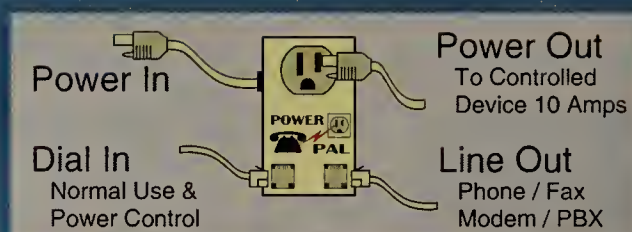
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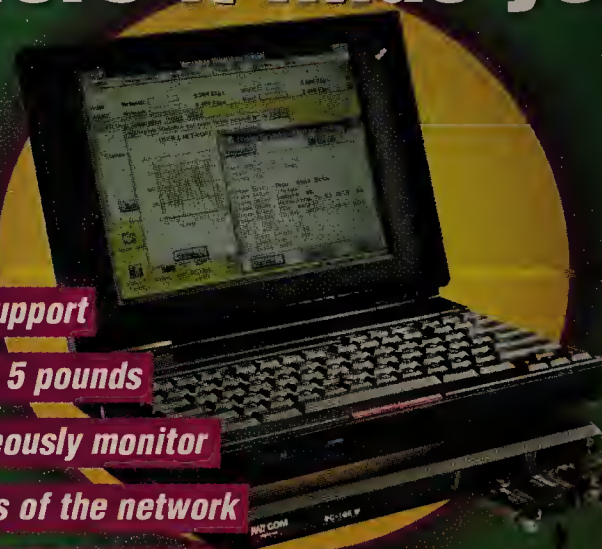
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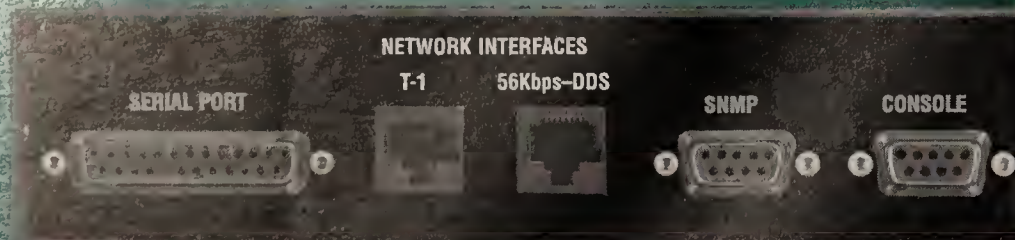
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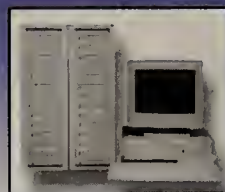
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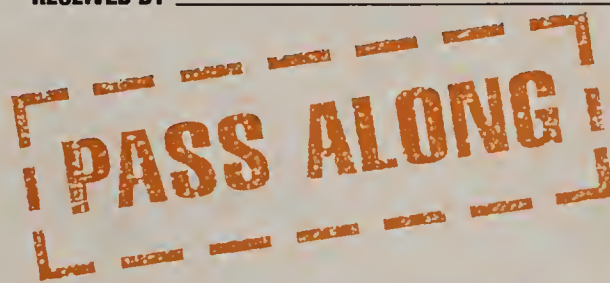
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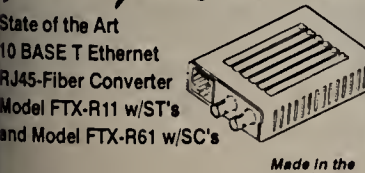
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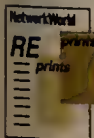
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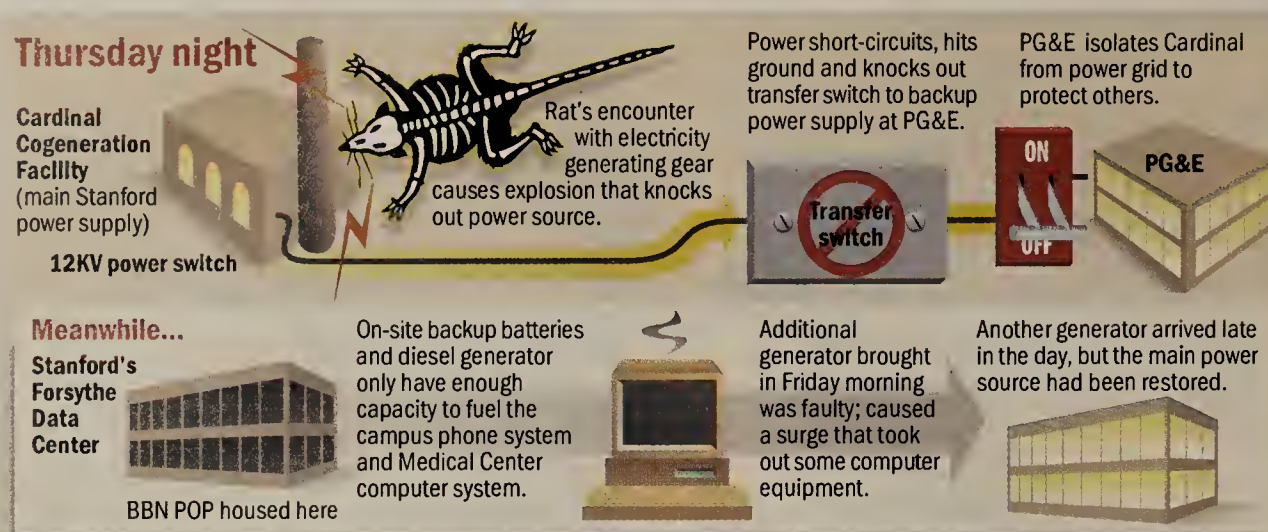
Rats

Continued from page 1

sode underscores the need to shore up your own Internet disaster-recovery plans, including examining contingencies ISPs have in place.

The primary source of power for BBN's point of presence (POP) on the Stanford University campus is the school's own power generation facility. When a rat stumbled onto a main power switch on Oct. 11, it got electrocuted and caused a short that cut off the power supply. To compound the problem, a transfer switch designed to cut over to the backup power supplier, Pacific Gas & Electric Co., ultimately failed (see graphic).

Experts fault BBN for not cementing its disaster-recovery plan with its own heavy-duty backup power generator — a staple at telephone company central offices. The university's two-hour battery backup proved inadequate, despite a BBN spokesman's claim that the POP



was telco-grade. (BBN has since installed two generators of its own in the facility.)

"[BBN] should have constructed this facility with their own 24-hour standby generator connected to their own separate transfer switch, so when the power went out it would kick in the generator," said Nathan Stratton, chief executive officer of NetRail, Inc., an ISP start-up in Arlington, Va.

When the power failed at BBN's Stanford site — one of two World-Wide Web hosting facilities the company operates — so did hundreds of companies' Internet connections and Web pages, including those for the *Los Angeles Times*, the *Chicago Tribune*, Apple Computer, Inc. and Sun Microsystems, Inc.

Telco-grade backup

To avoid such disasters, most of the top nationwide ISPs, including UUNET Technologies, Inc. and PSINet, Inc., are

moved some facilities into telephone company 911 central offices, largely to rely on years of phone company disaster planning, according to Pushpendra Mohta, director of CERFnet. Telco-grade facilities are run in a pretty standard way. For example, an AT&T spokesman said the carrier relies on eight to 10 hours of uninterruptible power supply battery life and diesel-powered generators with enough fuel to produce power for 72 hours.

Large ISPs carrying "the lifeblood of the Internet to many businesses should include diverse routing and the ability to run off the power grid for 48 hours at minimum," said Patrick Chicas, principal founder of Net-Builder Consulting Services, an independent consultancy based in Hawaii.

Protect yourself

Consultants agree users should investigate such factors as UPS battery life and whether their ISPs maintain on-site generators at POPs or resort to mobile generators that can be wheeled to trouble sites.

There are other steps you can take to protect your Internet connections.

On the access side, you can multihome your site to different ISPs. For instance, Apple operates a DS-3 link to BBN and a T-1 circuit to CERFnet, which enabled it to maintain an E-mail flow during the BBN outage.

There are several ways to multihome.

- Run parallel lines to different POPs, dividing the full capacity you need in two halves, said James McManus, vice president of systems engineering at UUNET. That way, in the event of a failure, "you might see some degradation in service, but you won't be down, and you won't be spending double the price for the additional link."

- Fall over to a backup link. PSINet, for example, offers an

Emergency Backup Service. A customer site running a dedicated link to a PSINet POP could automatically bring up an ISDN link that dials a different PSINet POP should the primary POP, or the link to it, fail.

(AGIS). Phil Lawlor, president of the firm, said AGIS is building 20 telco-grade facilities worldwide, at a cost of \$1.5 million each, in which it will allow customers to collocate their Web servers.

AGIS has fiddled with its routers so a single IP address can be read by different routers as a different destination. So, for example, if you have Web servers in five POPs around the country, there would be diverse routing among them over the AGIS frame relay backbone. If one POP goes out, the router would reroute to the POP nearest the user where the same Web server was replicated. This improves efficiency in the AGIS backbone and performance for the user, and ensures diverse paths to the same content, Lawlor said.

AGIS plans to have five such

The irony in the outages

The rodent that got electrocuted at Stanford could not have had worse timing as far as BBN Planet is concerned.

The resulting power outage that knocked out BBN's Palo Alto, Calif., point of presence (POP) hit a mere two weeks after BBN announced a 99.9% network availability guarantee. At the time, BBN was brimming with confidence, having just finished fortifying its T-3 nationwide backbone with several redundant POPs collocated in telephone company central offices. The bottom line: Users experiencing an unplanned outage of 15 minutes or more in a 24-hour period receive a day's credit.

And the outage happened just days before America Online, Inc. — which itself experienced an 18-hour outage in August — announced it has expanded its commitment with BBN to build out its AOLnet private TCP/IP dial-up network. The two companies have signed a \$340 million, four-year deal for BBN to supply modems, operate and maintain part of AOLnet. The other portion is run by AOL's ANS CO+RE Systems, Inc. subsidiary.

—Joanie Wexler

- Check for switched access into ISP backbones. CERFnet's Mohta said his company maintains two POPs in each local access and transport area; its use of frame relay, Switched Multi-megabit Data Service and ATM services gives users virtual connections to both local POPs in the event one takes a hit.

Host hits

Another area in which you may need to devise contingency plans is your Web site location. Apple, for instance, is in the process of creating geographically diverse Web sites in California and Texas. In time, Apple plans to house similar parallel sites in the Netherlands and Singapore.

One option on the horizon for power users is a service dubbed CooLocation, about to be rolled out by Dearborn, Mich.-based ISP Apex Global Information Systems, Inc.

facilities up in the U.S. by January, and 12 to 20 up by the end of next year. It will charge about \$750 a month for the service.

Other ISPs offer distributed Web server hosting, although not necessarily with the kind of load balancing and redundancy features AGIS is planning.

PSINet is hosting Web servers in more than half of its nationwide POPs, while UUNET hosts in three and BBN in two. In addition, bundled into PSINet's hosting fee is a redundant server in a POP geographically diverse from the first, said Ed Frankenberg, a PSINet product manager.

There is a way Web users could have survived the BBN disaster by mirroring their Web server to BBN's location in Cambridge Mass. That configuration cost about twice the price of hosting a server at a single facility, a spokesman said. But it will keep the rat from bringing you down. ■

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now collocating their equipment in telephone company central offices — which are conditioned with battery power, backup uninterruptible power supplies and generators that last for two to three days. BBN itself, for instance, which turned up a fortified T-3 backbone Oct. 1, said the POPs within that part of the backbone are, indeed, housed in phone company facilities.

CERFnet, a regional ISP based in San Diego, has even

T-3

Continued from page 1

riers earlier this year (NW, Jan. 22, page 14), meaning end-to-end T-3 frame relay is just around the corner. That could spell trouble for wide-area ATM deployment because frame relay could fill the broadband needs being eyed by promoters of ATM.

"Once T-3 frame relay is installed, it's unlikely users will take it out," said Rick Malone, principal with Vertical Systems Group in Dedham, Mass. "Inertia is the driver for most of these services."

Although many companies had been planning to use frame relay-to-ATM service interworking to tie remote offices served by frame relay to an ATM backbone, interworking is only offered by Ameritech today.

"If frame relay-to-ATM service interworking had gone a lot faster, there really wouldn't be a need for the T-3 interface for frame," Malone said. "Most of the users we surveyed had planned to use that interface once they got beyond the capacity of a T-1 at the home office."

The price is right

Only the largest users could fill up a significant portion of a 45M bit/sec pipe, but aggressive pricing may make that irrelevant. Pacific Bell said it would charge about \$5,000 per month for a T-3 port and network interface, while US WEST said it would charge \$2,500 to \$3,000. There are no usage charges.

At those prices, it would be less expensive to buy T-3 if you need more than two T-1 ports, according to Jim McDonnell, systems manager for Rock Tenn Co., a manufacturing company in Norcross, Ga. And that could make the service attractive.

"Of course, we wouldn't use all the bandwidth," McDonnell said, but its availability would raise the possibility of working voice over frame relay into the equation.

That could eliminate the cost of some dial-up or private-line expenses between corporate sites. "You could really look at a single telecom strategy. It would be your major corporate pipe," he said.

Too much to learn

Beth Gage, senior broadband consultant with TeleChoice, Inc. in Verona, N.J., said ATM would still be the choice of users that need to support delay-sensitive traffic such as video. The varying size of frame relay frames introduces delay that can, for example, clip syllables in frame relay voice traffic. ATM offers various qualities of service capabilities to address that delay

problem.

Gage said the T-3 frame relay would simplify service management and reduce the amount of gear at central sites by reducing the number of incoming T-1 lines and ports needed.

Staying with frame relay would also save users from buying ATM gear and training staff to work with ATM, thereby

saving money.

US WEST said that during recent meetings, users from large frame relay shops said they were reluctant to retrain for ATM, having just become comfortable with frame relay.

One large user who asked not to be named said T-3 frame relay will not make the frame relay vs. ATM decision any eas-

ier. The user said he still faces the decision of whether it is worth it to pay more for the added functionality of ATM or simply add bandwidth with frame relay. ■

COMMENTS?

See "How to reach us" on page 6.

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Circle Reader Service #24

Buying a new laptop: CompUSA gets the last laugh and we find Effigy

Well, I went and bought a new laptop. Before the addition to my family is named, let me just review the purchasing process.

Even though I have recently been critical of CompUSA (July 8, Sept 23), I knew it had good pricing. So off I trotted to check out what it had.

In the laptop display area, there were a total of six or seven models from Toshiba Corp., Hitachi America, Ltd., IBM and Compaq Computer Corp. I was looking for a multimedia machine, so that narrowed down the field, and the one that caught my eye was a Compaq.

Nice specs, nice looking, came with a detachable port expander with speakers built in — pretty cool. Of course, had the display model actually been working it would have been nice.

The question I had was whether CompUSA could increase the RAM to 40M bytes without having to order special items from Taiwan with a three-month lead time.

The chap at the upgrades counter was not a jolly type. None of that silly smiling and, “Good morning, can I help you?” stuff.

He looked up the RAM and said it would take at least two weeks to get it, but then, oh, the machine has been discontinued. “You mean I’ve just wasted 20 minutes assessing a machine I can’t buy?” I asked.

Apparently so.

I suggested that it would take all of five seconds to remove the displayed machine from its place on the shelf, but apparently undisplaying a laptop is no trivial matter.

Well, which multimedia machines were available? It turned out that more than half the laptops on display were discontinued, leaving only the low-end machines. I left feeling like I had just visited an asylum for insane retailers.

When I got home, I was therefore pleased to find an E-mail message from Bruce Atlas of PC Compleat at (800) 669-4727. His mission: To read *Network World*, contact strange columnists and boldly sell where no salesperson has sold before.

Bruce was no ordinary salesperson. He had a telephone and fax. PC Com-

*When all the cool names
are gone, will vendors
start to call products*

Kalamazoo and Effigy?

pleat has a Web site. He even E-mailed me quotes! My kind of salesperson.

Bruce said he hadn’t seen my previous columns (bad salesperson), and I briefly mentioned my abortive buying trip to CompUSA. When he told me that CompUSA owns PC Compleat, I laughed so hard I fell off my chair. But I ordered a machine from him anyway.

So yesterday my new laptop arrived. A Fujitsu Milan. Which leads me to digress: What is this obsession with geography the computer industry has developed? When all the cool names are gone, will vendors have to start calling products things like Kalamazoo and Effigy?*

A fine machine — 120-MHz Pentium, 1.2G-byte hard disk and 40M bytes of RAM, all for a pretty good price.

But of course, nothing in the computer business is straightforward.

The machine has an active matrix screen and, to my irritation, two pixels are permanently switched on. To red.

I dropped Bruce an E-mail, and he called to tell me this is typical and that many machines with active matrix screens have a few dead or, as in my case, overactive pixels. (Why have I never seen this in a brochure?)

So, ladies and gentlemen of the jury, is this the case? What’s the most pixels you’ve seen dropped out (or in). Should I just grin and bear it?

Gibbs yearns for your feedback at mgibbs@gibbs.com, or call him at (800) 622-1108, Ext. 504. His intranet seminars start this week. Call (800) 643-4668 for info. Be there or get left in the virtual dust.

*Gary Masters of Texas A&M University was kind enough to drop me a note following my last column to let me know that Effigy is on Highway 83 south of Laredo toward Zappata. A “But I digress” T-shirt is on its way to him.



Mark Gibbs

For now, Bells’ legal gambit has killed telecom reform

Last week, the media buried the news that telecommunications reform is dead. Opinion makers did not want to say so, but the reality of a new federal court ruling is bleak. Don’t expect real competition in the \$90 billion local market for at least another year, probably longer.

I predicted trouble early last month when GTE Corp. and other local phone companies petitioned the court to quash new Federal Communications Commission antimonopoly rules. Local phone companies proved they are better arm wrestlers than Congress and the FCC.

Local Bell phone companies have made a mockery of the Telecommunications Act of 1996. They were pro-reform boosters. But faced with a real end to the gravy train, several ran to the court, begging for an extension to their monopolistic lifestyle. What a sham.

Last Tuesday, a three-judge panel on the Eighth Circuit Court of Appeals ruled in the Bells’ favor, suspending several FCC rules issued in August.

Property and market dominance amassed by the Bells is the byproduct of regulation. In a sense, the Bells have what they have because of a public trust.

Now-defunct rules had directed Bells to give competitors steep discounts on interconnecting with local switching equipment. Competitors would have received discounts of 17% to 25% off the retail price of local service and 50% to 60% off network equipment. The FCC’s intention was to create competition — and a profit-making opportunity for competitors that did not own local switching offices.

The Bells said the discounted services and equipment were below their cost. Their generous discount offer to competitors was about 5%. Seems like they might get their way after all.

The FCC said it will appeal to the

Supreme Court, probably joined by major long-distance companies that want into local markets. But appeals will take time, lasting at least a year.

The Bells won this latest round by arguing that FCC-mandated discounts would have been an unconstitutional confiscation of their property.

I am not a constitutional lawyer, but I have done a good share of study on property rights. I believe they are one of the most important rights of society.

The Bells were clever to appeal to this principle. Appealing to a principle is the quickest way to stop any activity.

The tricky part is defining property ownership — or in this case, how the Bells got the property in the first place.

Local phone companies are the offspring of a huge monopoly.

With some exceptions, users have had just one choice for buying local telephone service and this one choice was protected by government regulation.

Property and market dominance amassed by the Bells is thus the byproduct of regulation. In a sense, the Bells have what they have because of a public trust. They did not earn it in a traditional way.

So how can the Bells logically claim confiscation of their unique classification of property? Their argument is specious and will be struck down.

Unfortunately for users seeking competitive options, that will take time.

We obviously cannot completely deregulate telecommunications overnight. That would create chaos.

The FCC’s intention was to phase in deregulation, gradually creating a level playing field.

Deregulating local telecommunications service is not a rosy proposition for the Bells. They will lose market share. But if the Bells want to gain access to other competitive markets (such as long distance), they must quit being mulish.

The Bells’ legal shenanigans will temporarily conserve their \$90 billion revenue stream. But customers have long memories, especially when new freedom of choice is yanked from under their feet.

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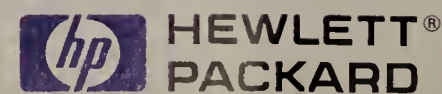


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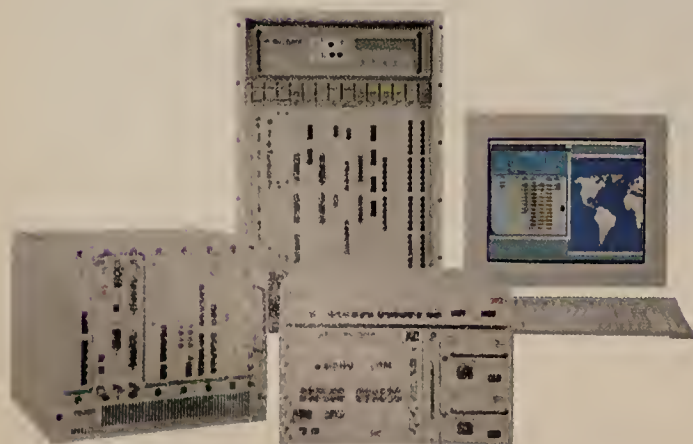
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